RUBBER WORLD

OUR 65th YEAR

A BILL BROTHERS PUBLICATION

SEPTEMBER, 1954

This **LOW COST** Cabot Oil Furnace Carbon Black

Adds **DOLLAR VALUE**

to YOUR CARCASS AND TREAD BASE COMPOUNDS . . .

CABOT **Sterling®V**

V for VERSATILE and VALUE

Sterling® V is excellent for SIDEWALL, CARCASS, BREAKER, CUSHION, UNDERTREAD AND BEAD STOCK COMPOUNDS, *because it gives*

GOOD PROCESSING PROPERTIES
LOW HEAT BUILD-UP
HOT TENSILE STRENGTH
HOT TEAR RESISTANCE

CABOT

For further technical information, write

GODFREY L. CABOT, INC.
77 FRANKLIN ST., BOSTON 10, MASS.

TABLE OF CONTENTS ON PAGE 781

For use under severe oxidizing conditions—

Make your products with

HYPALON®

(Chlorosulfonated polyethylene)

Use Hypalon® chlorosulfonated polyethylene when service involves severe oxidizing conditions and when other elastomers are inadequate. Under these conditions, products made of "Hypalon" are effective and economical.

SEVERE OXIDIZING CONDITIONS INVOLVE:

OZONE—Products of "Hypalon" have complete resistance to ozone.

ELEVATED TEMPERATURES—Products of "Hypalon" give excellent service at temperatures up to 300°F.

ACIDS AND CHEMICALS—"Hypalon" is recommended where sulfuric, nitric and other oxidizing acids and chemicals are present.

In addition, "HYPALON" offers:

- Real color stability
- Flexibility and abrasion resistance even in thin films
- Good processing properties

Use in compositions for:

- Acid hose tubes
- Linings for bleach, chrome plating and pickling tanks
- Pump impellers, valve diaphragms
- Steam-hose covers
- Spark-plug boots
- Rolls for glass, chemical and steel industries
- Protective coatings

DISTRICT OFFICES:

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DU PONT RUBBER CHEMICALS

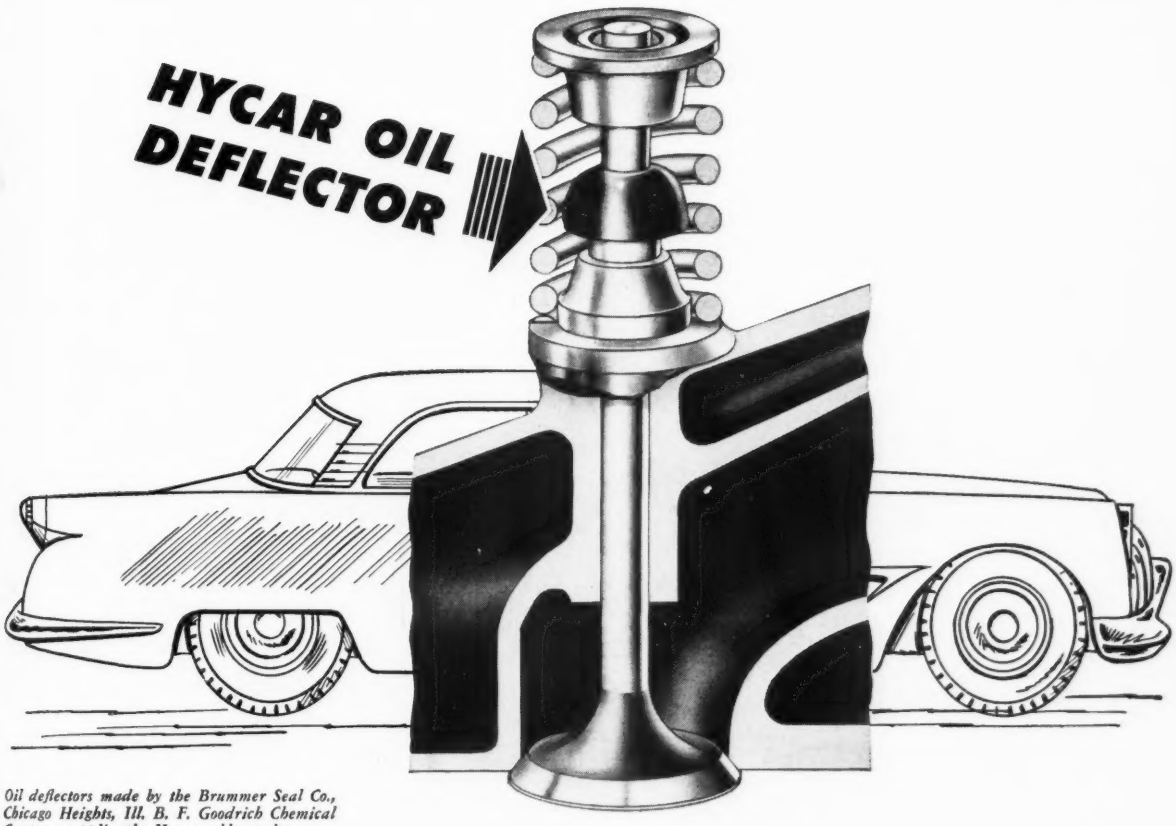
DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

RUBBER WORLD, September, 1954, Vol. 130, No. 6. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States, $5.00 per year; Canada, $6.00; All other countries $7.00; Single Copies 50 cents. Address Mail to N. Y. Office.

Another new development using

B. F. Goodrich Chemical *raw materials*



Oil deflectors made by the Brummer Seal Co., Chicago Heights, Ill. B. F. Goodrich Chemical Company supplies the Hycar rubber only.

DESIGN IMPROVEMENT IN OVERHEAD VALVE ENGINES

HERE'S an idea that eliminated a major cause of sparkplug fouling in overhead valve engines. A flexible umbrella-like part was designed that prevents oil from running down the valve stem into the combustion chamber. But one big problem was to find a material that keeps its strength and flexibility when drenched with hot oil for long periods. Hycar American rubber was the answer! It was the only material of many tested that withstood the tough operating conditions.

Molded from Hycar, the oil-wet deflectors are subject to temperatures above 200° F. during engine operation and below 0° F. in winter. The deflectors showed practically no deterioration after thousands of hours in actual road tests.

This new use for Hycar American rubber may give you an idea for solving a difficult design problem where severe operating conditions must be met. Parts made from Hycar—such as O-rings, seals, gaskets, etc.—are ideal for many applications requiring exceptional resistance to oil, abrasion and high temperature aging. For information, please write Dept. HA-9, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U.S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors



E for Excellence

The trend to *Performance* with a capital "P" in new model cars probably explains in part the upsurge of interest we see in our Philblack° E.

Surely our Super Abrasion Furnace black is the answer to tire men's prayers for a top line tread that will take it when Leadfoot Louie puts the spurs to all those brand-new horses under the hood.

Furthermore, even the daintiest Miss or Mrs. can now bear down on the stopper pedal like a beefy trucker, thanks to power brakes.

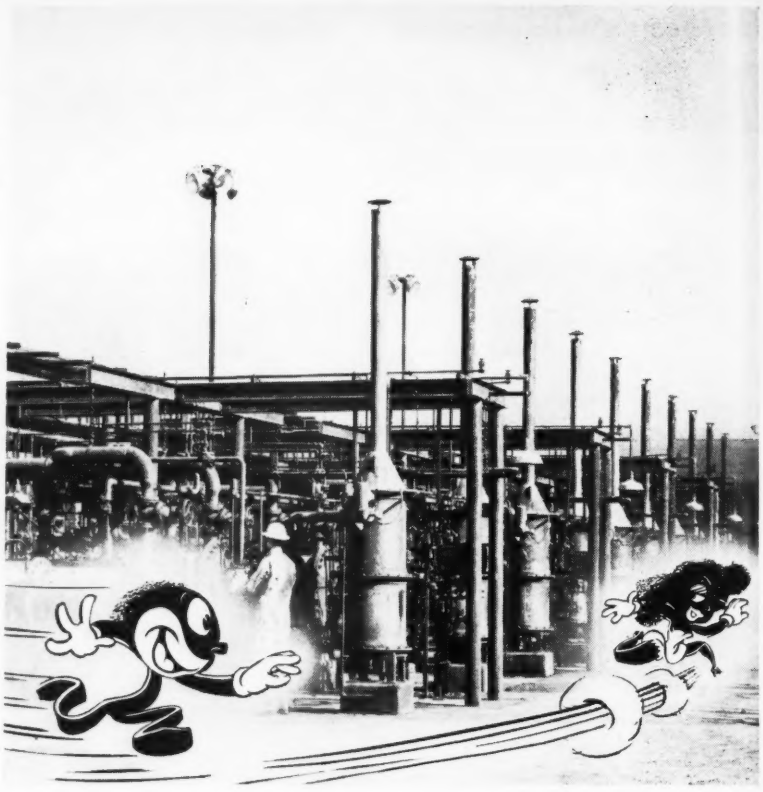
With this in mind it is worth noting that:

A. Passenger tire tests show Philblack E to be 35 to 43% superior to HAF black in GR-S-1500 tread stocks.

B. In natural rubber truck tires, Philblack E is 12 to 24% superior to EPC black. Also, the exceedingly good resistance to chipping, cutting and cracking conferred by Philblack E greatly extends the life of big tires in rugged service which often fail before they are worn smooth.

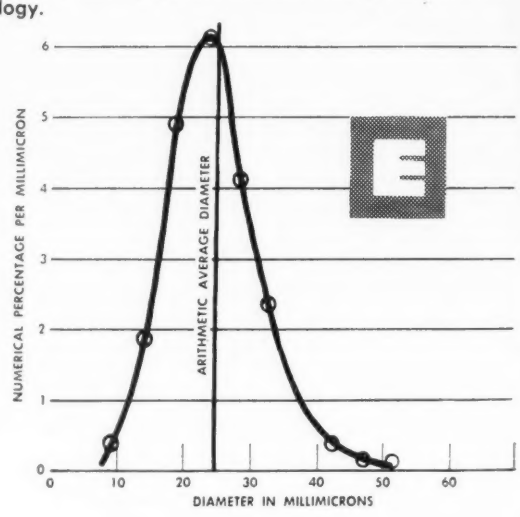
For that new nylon cord tire with all the extras – specify Philblack E. Our representatives will be glad to give you all possible technical assistance.

°A TRADEMARK



Philblack E reactor furnaces, above, represent one of the great advances in furnace black technology.

Extremely small particle size of Philblack E is evident in this chart (right). A wide range of physical properties can be obtained by varying Philblack E and softener levels. Your Philblack technical representative can help you choose black and softener levels to yield stocks of desired processability, tensile, hysteresis and hardness, all with excellent abrasion resistance.



Know the Philblacks! KNOW WHAT THEY'LL DO FOR YOU!

A **Philblack A FEF Fast Extrusion Furnace**
Ideal for smooth tubing, accurate molding, satiny finish. Mixes easily. High, hot tensile. Disperses heat. Non-staining.

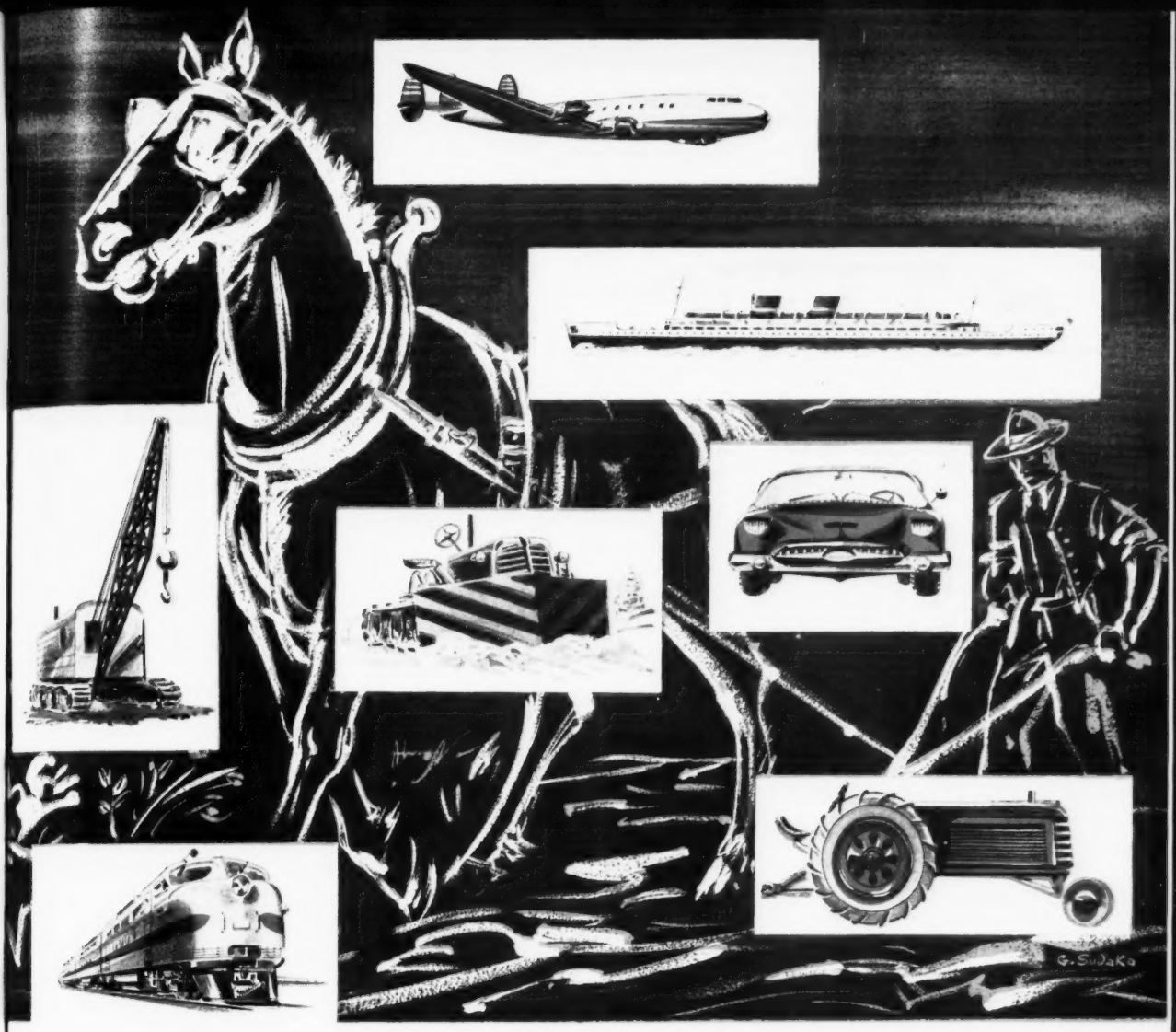
I **Philblack I ISAF Intermediate Super Abrasion Furnace**
Superior abrasion resistance at moderate cost. Very high resistance to cuts and cracks. More tread miles at high speeds.

O **Philblack O HAF High Abrasion Furnace**
For long, durable life. Good electrical conductivity. Excellent flex. Fine dispersion.

E **Philblack E SAF Super Abrasion Furnace**
Toughest black on the market. Extreme abrasion resistance. Withstands aging, cracking, cutting and chipping.

Phillips 66

PHILLIPS CHEMICAL COMPANY, Philblack Sales, 318 Water Street, Akron 8, Ohio. Export Sales: 80 Broadway, New York 5, N. Y. West Coast: Harwick Standard Chemical Company, Los Angeles, California. Canada: H. L. Blachford, Ltd., Montreal and Toronto.



The new horsepower needs **Paracril!**

Steel, rubber, oil, and science have taken the horse out of horsepower—sent Dobbin the way of the kerosene lamp.

The *new* power is oil—oil that burns—oil that drives pistons and turbines in hydraulic systems—oil that lubricates moving parts to give the long reliable life essential to today's power equipment.

And Paracril® is the modern, oil-resistant chemical rubber that's outstanding for its ability to control the power of oil—in gaskets, seals, hydraulic hose and fittings, and a host of other applications where rubber-like properties are required.

Impervious to animal, vegetable, or mineral oils, fats, and greases, Paracril also provides excellent *abrasion resistance*, good *flexibility* over a wide temperature range, great *dimensional stability* and lasting *resilience*.

What's more, Paracril is available in three grades of oil-resistance, in bale or crumb form, and is extremely easy to process. It may be calendered, extruded, molded, or solvated for use in cements and adhesives—blended with plastics or other rubbers to impart special desirable properties.

See how Paracril can be an invaluable plus to *your* rubber products. Learn more about Paracril's many advantages by writing on your letterhead to the address below.

50TH ANNIVERSARY 1904 1954 NAUGATUCK CHEMICAL

Naugatuck Chemical

Division of United States Rubber Company

139 ELM STREET, NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

RUBBER CHEMICALS • SYNTHETIC RUBBER • PLASTICS • AGRICULTURAL CHEMICALS • RECLAIMED RUBBER • LATICES

ELECTRICALLY INTERCHANGEABLE

and it dry blends, too—new PLIOVIC EDB90V

HERE'S electrifying news for wire coverers and other users of vinyl resins in applications where insulative properties are important. It's PLIOVIC EDB90V —the first of Goodyear's new series of electrical grade resins approved on an interchangeability basis.

PLIOVIC EDB90V is a straight polyvinyl chloride resin. But it's tailor-made with three specific aims in mind. The first is to give you a resin of approved electrical quality. The second is to give you a resin that is truly easy to extrude using a dry blend process. The third is to give you both these advantages with no sacrifice in physical properties.

PLIOVIC EDB90V easily passes the tests required by Underwriters' Laboratories, Inc., including the T and TW Building Wire Specifications and the 80°C. and 105°C. Appliance Wire Specifications. It is fully interchangeable with all other approved electrical grade vinyl resins. It dry blends readily into a smooth, free-flowing mix. It extrudes and calenders well. And it possesses excellent physical properties.

The primary reason for the unique combination of properties in PLIOVIC EDB90V is careful polymerization. Particular attention is paid to the close control of molecular weight and particle size, shape and distribution. Extra effort also is exerted to eliminate impurities. This is the same care and control that characterize the production of all PLIOVIC resins, developed to a much finer degree.

PLIOVIC EDB90V is new, but not untried. It has been fully proved—and approved —in exhaustive tests and trial plant runs. Why not prove it in your plant? Samples and top technical help on it and other new, electrical grade resins are yours by writing to:

Goodyear, Chemical Division, Akron 16, Ohio

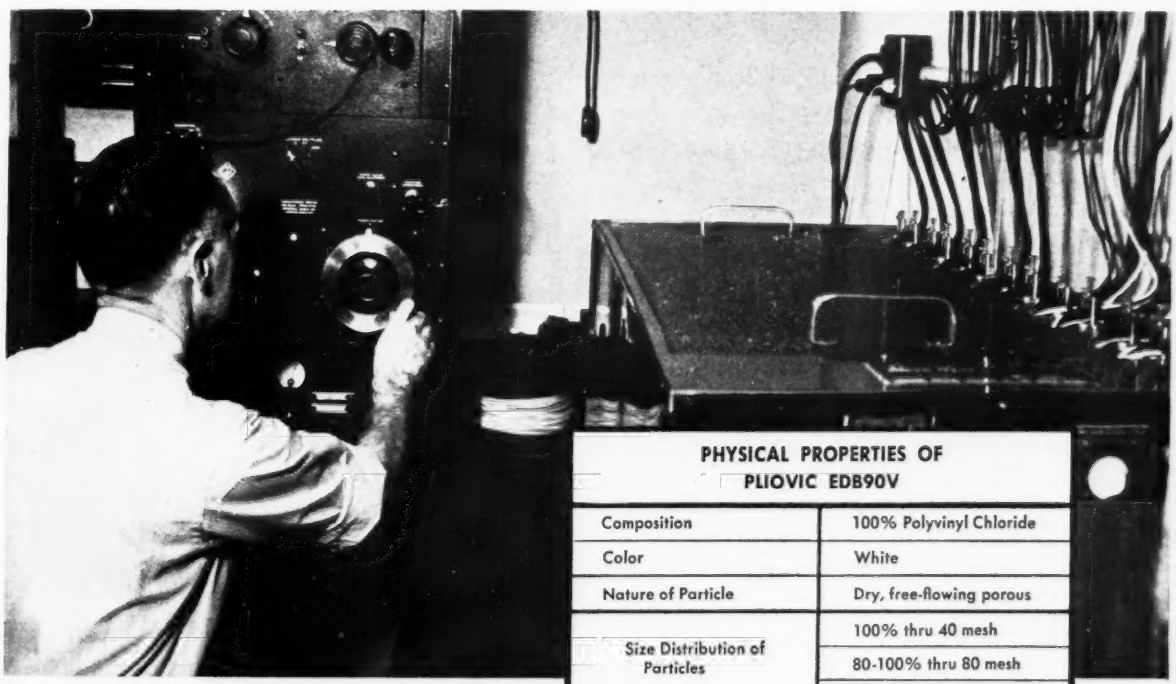
CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

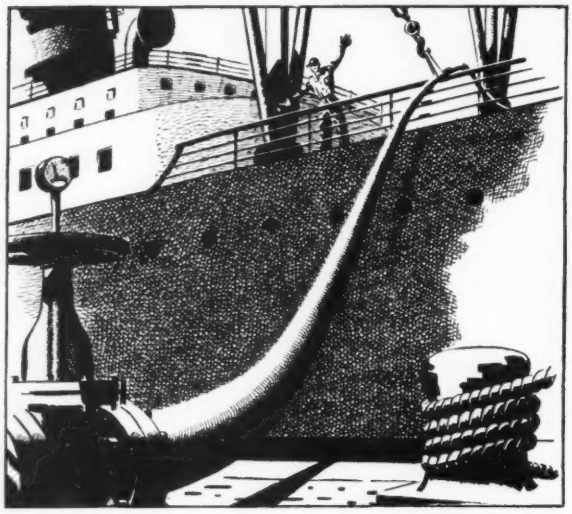


PLIOVIC EDB90V successfully passed rigorous tests such as these – Insulation Resistance Test (above) and Dielectric Constant Test (below)—to be declared fully interchangeable with all other approved, electrical grade, vinyl resins by Underwriters' Laboratories, Inc.



PHYSICAL PROPERTIES OF PLIOVIC EDB90V	
Composition	100% Polyvinyl Chloride
Color	White
Nature of Particle	Dry, free-flowing porous
Size Distribution of Particles	100% thru 40 mesh
	80-100% thru 80 mesh
	0-15% thru 200 mesh
Intrinsic Viscosity	0.90 Av.
Specific Gravity	1.40 Av.
Bulk Density	38 lbs./cu. ft. av.
Volume Resistivity	2×10^{15} ohm centimeters (av.)

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—
every other Sunday—NBC TV Network

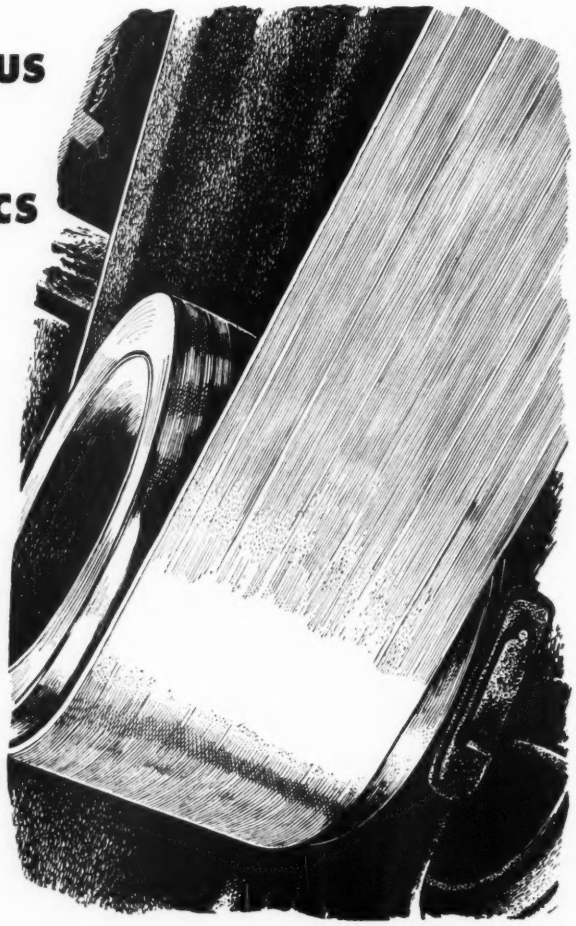


"Shawmut" hose duck is a soft, strong, plied-yarn fabric affording flexibility and good impregnation in a variety of hose applications.



"Columbus" sheeting is ideally suited for service rainwear and other rubberized products because of its constantly uniform quality.

YOU GET PERFORMANCE-PLUS WITH WELLINGTON SEARS "FIBER-ENGINEERED" FABRICS



In developing high-performance belt fabrics for the rubber industry, Wellington Sears engineers draw upon the special advantages of many textile fibers and fiber combinations.

In addition to "Shawmut" belting duck, long-known as a standard among cotton belt fabrics, Wellington Sears has developed fabrics "fiber-engineered" to meet special requirements—such as unusual strength combined with minimum weight and bulk. These fabrics give you performance-plus—service-plus—features because they utilize to the full the unique qualities of cotton, nylon, high-tenacity rayon and other fibers... singly or in combination.

You'll find other Wellington Sears fabrics for various mechanical rubber products, coating applications and specialties, listed below.

Write for your free copy of "Modern Textiles for Industry" which includes pertinent information on rubber applications. Address: Wellington Sears Co., Department K-7, 65 Worth Street, New York 13, New York.

Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
- Single and plied-yarn chafers
- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high tenacity rayon, other synthetics and combinations.

Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

Offices In: Atlanta • Boston • Chicago • Detroit • Los Angeles • New Orleans • Philadelphia • San Francisco • St. Louis

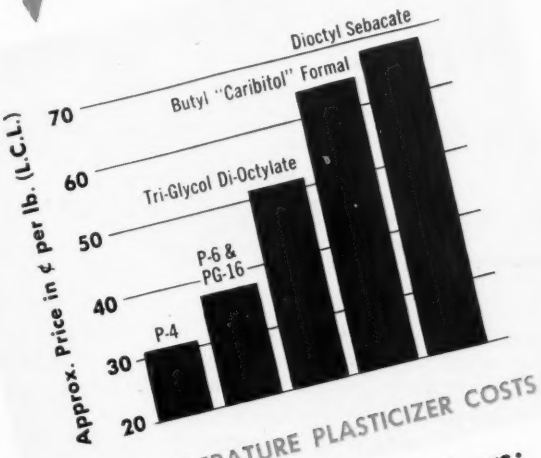


Lower costs...

for LOW TEMPERATURE... LOW VOLUME SWELL

SYNTHETIC RUBBER

Plasticizers



LOW TEMPERATURE PLASTICIZER COSTS

FLEXRICIN® plasticizers are fully equivalent and, in many cases, superior to the commonly used low temperature plasticizers. Added features are their extremely low volume swell in aromatic fuels and excellent recovery on low temperature compression set. Their cost is much lower. Check this graphic comparison and you will see that costs can be cut substantially.

Flexricin Rubber Plasticizers:

PG®-16, Butyl Acetyl Polyricinoleate
FLEXRICIN®P-4, Methyl Acetyl Ricinoleate
FLEXRICIN P-6, Butyl Acetyl Ricinoleate
FLEXRICIN P-4, Methyl Acetyl Ricinoleate

Medium Nitrile Rubber
High Nitrile Rubber
Neoprene GN
GRS

ESTABLISHED 1857

THE Baker CASTOR OIL COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

LOS ANGELES • CHICAGO

MAIL CONVENIENT COUPON FOR 1 QUART SAMPLES AND TECHNICAL DATA SHEETS. PLEASE CLIP TO YOUR LETTERHEAD.

THE BAKER CASTOR OIL CO.
120 BROADWAY, NEW YORK 5, N. Y.

Please send samples of the Ricinoleate Esters checked or Technical Data.

☐ PG-16 ☐ P-4 ☐ P-6

☐ Technical Data

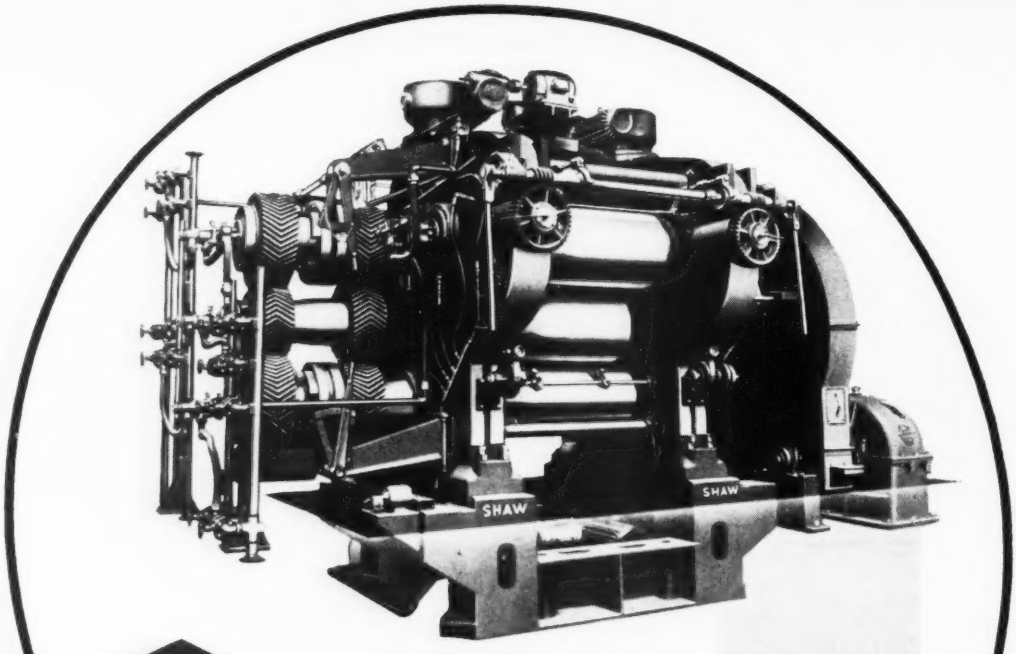
Name_____

Firm _____

Address _____

_____

RW-94



FOR HIGH PRODUCTION AT LOW COST

Shaw three and four roll calenders incorporate many features of advanced design and are fitted with chilled cast iron rolls, cambered to meet customer's requirements. The automatic flood lubrication system, now standard on all Shaw high speed calenders, ensures more accurate temperature control and reduces maintenance to a minimum. For the production of fine sheeting, a constant nip opening between the top and centre rolls is maintained by a self-contained hydraulic jacking system. The gearing is machine cut throughout, and the speed range can be controlled by means of variable speed motors. The individual motorized roll adjustment is controlled by push button.

SHAW

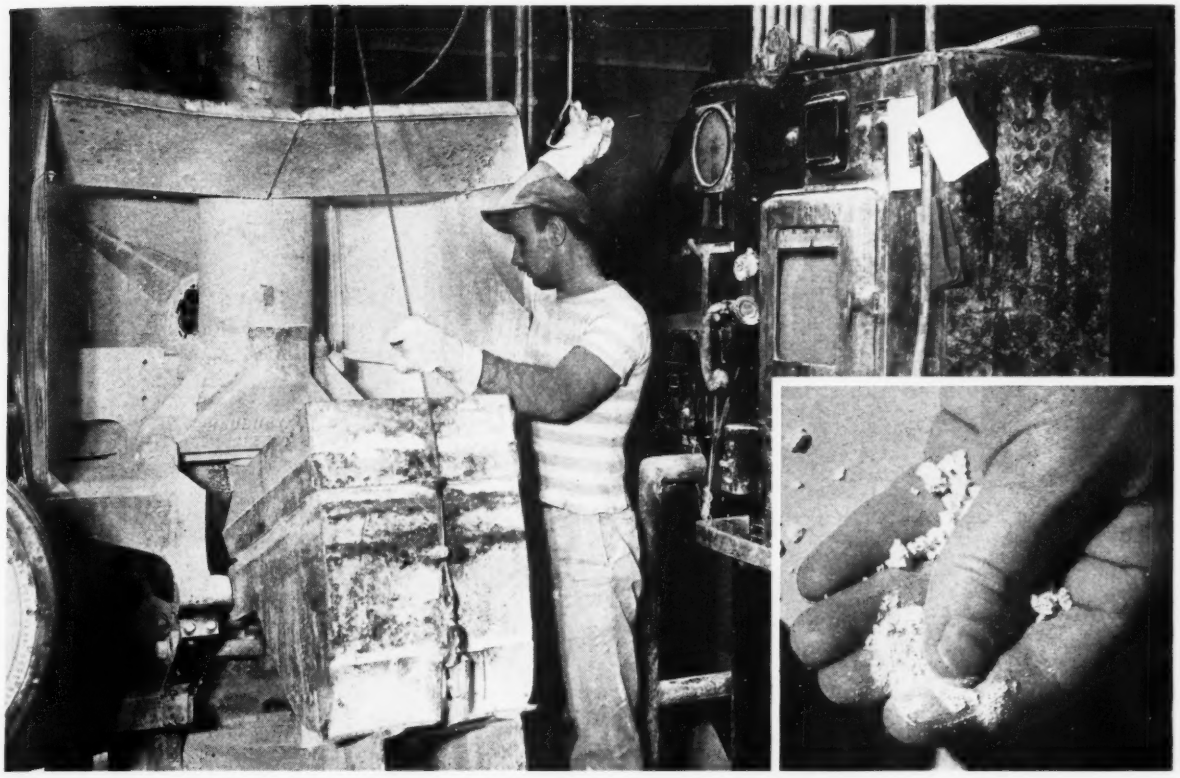
CALENDERS

FRANCIS SHAW & CO., LTD., MANCHESTER 11, ENGLAND

Enquiries to FRANCIS SHAW (CANADA) LTD., GRAHAM'S LANE, BURLINGTON, ONTARIO, CANADA

P4868

MUCH LESS FLY LOSS than pictured here is yours when you use easily friable (see inset), minimum dusting granules of PLIOLITE S-6B. More usable reinforcement per pound of resin, better working conditions, lower costs result.



SAVE RESIN—SAVE MONEY

on shoe sole stocks with granular PLIOLITE S-6B

PICTURED above is what your Banbury *won't* look like, if you use PLIOLITE S-6B—the *first* rubber-reinforcing, high styrene-butadiene copolymer to be supplied in easily friable, minimum dusting granules.

This granular form not only means less fly loss during mixing, but also permits maintenance of uniformity that results in a constant, higher bulk density. And this spells lower costs through smaller, more manageable bags and larger Banbury charges.

Moreover these granules quickly break down into a fine powder to give you an easier, faster, more thorough dispersion—more reinforcement per pound—and a better combination of shoe sole properties – than any other reinforcing resin. You can prove all this in your own laboratory with the generous samples and technical assistance that come from writing to:

Goodyear, Chemical Division, Akron 16, Ohio

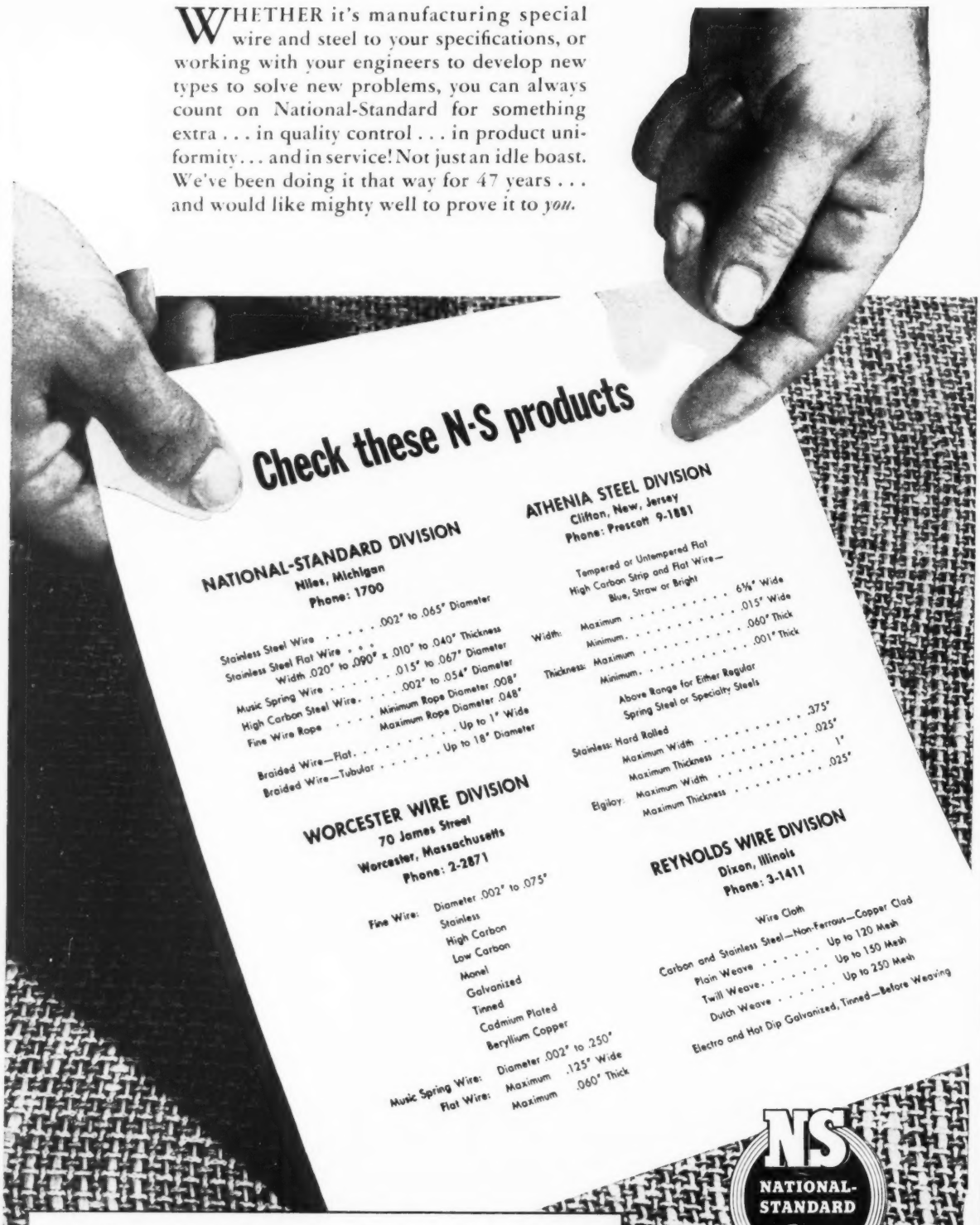
CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

Need special-purpose wire or steel?

WHETHER it's manufacturing special wire and steel to your specifications, or working with your engineers to develop new types to solve new problems, you can always count on National-Standard for something extra . . . in quality control . . . in product uniformity . . . and in service! Not just an idle boast. We've been doing it that way for 47 years . . . and would like mighty well to prove it to *you*.



Check these N-S products

NATIONAL-STANDARD DIVISION
Niles, Michigan
Phone: 1700

Stainless Steel Wire . . . . . .002" to .065" Diameter
Stainless Steel Flat Wire . . . Width .020" to .090" x .010" to .040" Thickness
Music Spring Wire . . . . . .015" to .067" Diameter
High Carbon Steel Wire. . . . . .002" to .054" Diameter
Fine Wire Rope . . . . Minimum Rope Diameter .008" Maximum Rope Diameter .048"
Braided Wire—Flat. . . . . Up to 1" Wide
Braided Wire—Tubular . . . . . Up to 18" Diameter

ATHENIA STEEL DIVISION
Clifton, New Jersey
Phone: Prescott 9-1881

Tempered or Untempered Flat High Carbon Strip and Flat Wire—Blue, Straw or Bright

Width: Maximum . . . . . 6⅜" Wide
Minimum. . . . . .015" Wide
Thickness: Maximum . . . . . .060" Thick
Minimum. . . . . .001" Thick

Above Range for Either Regular Spring Steel or Specialty Steels

Stainless: Hard Rolled
Maximum Width . . . . . .375"
Maximum Thickness . . . . . .025"
Elgiloy: Maximum Width . . . . . 1"
Maximum Thickness . . . . . .025"

WORCESTER WIRE DIVISION
70 James Street
Worcester, Massachusetts
Phone: 2-2871

Fine Wire: Diameter .002" to .075"
Stainless
High Carbon
Low Carbon
Monel
Galvanized
Tinned
Cadmium Plated
Beryllium Copper

Music Spring Wire: Diameter .002" to .250"
Flat Wire: Maximum .125" Wide
Maximum .060" Thick

REYNOLDS WIRE DIVISION
Dixon, Illinois
Phone: 3-1411

Wire Cloth
Carbon and Stainless Steel—Non-Ferrous—Copper Clad
Plain Weave . . . . . Up to 120 Mesh
Twill Weave. . . . . Up to 150 Mesh
Dutch Weave . . . . . Up to 250 Mesh
Electro and Hot Dip Galvanized, Tinned—Before Weaving

NS NATIONAL-STANDARD Company NILES, MICHIGAN

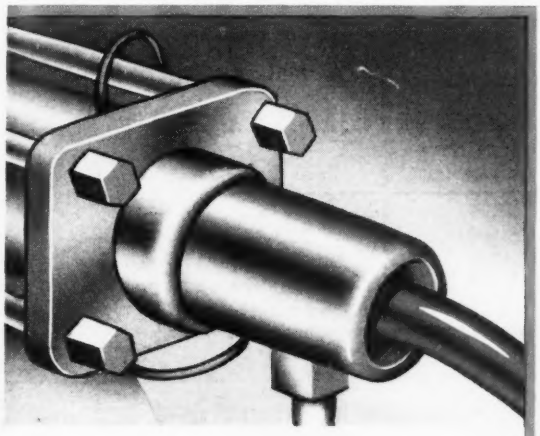
DIVISIONS OF NATIONAL-STANDARD CO.
NILES, MICHIGAN

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes



FOR BETTER STABILIZATION
of Calendered Vinyls – Plastisols, Organosols, Emulsions
under Heat, Light, Ultra-violet and Aging . . .
THERE IS A

STABELAN



For Excellent Heat and Good Light Stability

STABELAN HR

PASTE - -

A "single package" stabilizer for high heat resistance plus good light stability . . . Contains cadmium and barium components and synergized chelating agent. Disperses easily in dry pre-blends, solutions and dispersions.

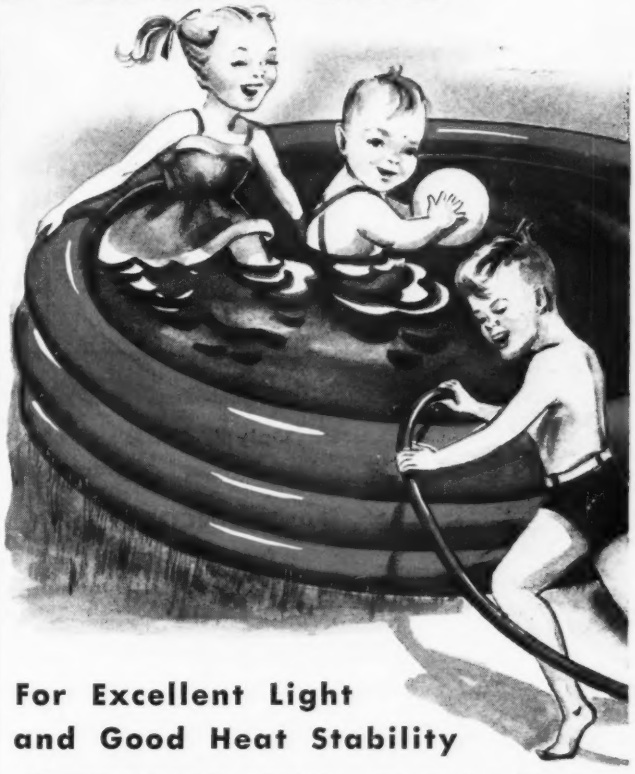
LIQUID - -

A synergized chelating agent.

POWDER - -

A metal bearing component of STABELAN HR paste.

STABELAN HR has been used with marked success in stabilizing all types of Vinyls containing organic and inorganic pigments.



For Excellent Light and Good Heat Stability

STABELAN E

STABELAN E — Paste — Provides excellent stabilizing for ultra-violet and outdoor aging . . . It gives good light fastness and heat stability. Heat stability and transparency may be improved when Stabelan E is used with Stabelan HR Liquid. Gives films that do not "blush" or absorb water . . . It is compatible with all tested pigments — even organic reds hold their hue and age well . . . It does not cause plating on rolls.

Write for complete data on these materials.

HARWICK STANDARD CHEMICAL CO.
AKRON, BOSTON, TRENTON, CHICAGO, LOS ANGELES

For

FASTER, SMOOTHER PROCESSING

Now Choose From

4 PROTOX* ZINC OXIDES

	Curing Rate	*Surface Area (Sq. meters/gm.)*	*Base Oxide*
1. PROTOX-166	Slow	4	XX-4
2. PROTOX-167	Slow	4	XX-4
3. PROTOX-168	Fast	8	Fine-Particle French Process
4. PROTOX-169	Fast	10	Kadox-15

Only PROTOX zinc oxides offer you these important processing advantages:

FASTER INCORPORATION

- Higher density
- Wet readily by rubber
- Minimize variations in rubber batches
- Low moisture pickup

MORE COMPLETE DISPERSION

- Cut mixing time
- Eliminate aggregates that serve as tear centers
- Increase zinc oxide efficiency of activation and reinforcement

SMOOTHER TUBING AND CALENDERING

- Provide an inherent plasticizing effect

All these processing advantages of Protox zinc oxides stem from both the exclusive coating of zinc propionate on the particles and the established high quality of the base oxides.

Which type of Protox zinc oxide do you need for tests?

*U.S. Patents, 2,303,329 and 2,303,330.



THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

Let's sit down and talk things over

Here at Adamson we've been doing something that we believe is rather unique in the industry. Every now and then a manufacturer of rubber or plastics has expressed a desire to discuss certain problems pertaining to calendering or calendering equipment, and we have invited him and his associates to our conference room for a roundtable session with our staff. No one dreamed the idea up—it just grew. Some of the largest manufacturers in the industry have been our guests and have described the meetings as helpful and enlightening.

Certainly, since we build calenders and related equipment, these clinics have been of great value to us. And because we believe that a free exchange of opinions and ideas is the surest way to promote progress and improvement in any industry, we extend to you and your company a cordial invitation to our conference room. Perhaps, like the famous riddle of which came first, the chicken or the egg, many questions will have to be left unanswered, yet the benefits to be derived from a free discussion of our common problems cannot fail to be mutually helpful.

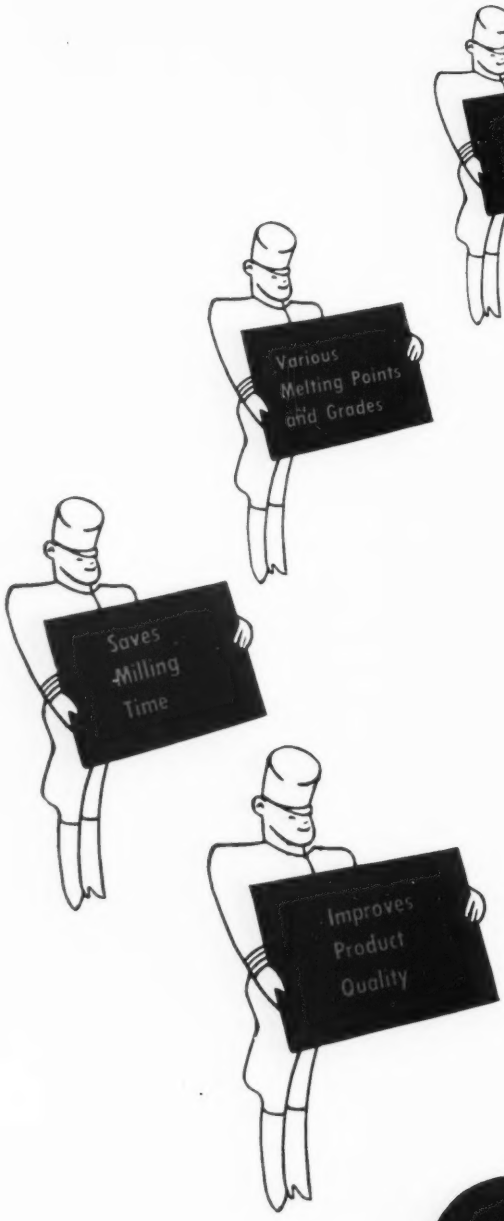
Why not 'phone or write us for a conference date? The obligation will be all ours.



ADAMSON UNITED COMPANY

BETTER MACHINES AND PROCESSES FOR BETTER RUBBER AND PLASTICS PRODUCTS

Neville Chemicals



for improving **rubber** products

Neville's years of experience with the problems of rubber manufacturers have produced a superior line of resins and oils for greater ease and uniformity in rubber processing.

Neville Coumarone Resins have long aided in processibility and pigment dispersion with improved physicals including heat stability, tensile and tear. They insure highest quality and maximum economy of production.

Let us help you select the right grade for your purpose.

NEVILLE

NEVILLE CHEMICAL CO.

PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal.

R-52

Nerve-Free...



CYCOLAC®

THE *New* HIGH-IMPACT
THERMOPLASTIC RESIN

Never misses the PRODUCTION TARGET

Cycolac is free from nerve or shrinkage; with a high in impact-resistance and heat-distortion temperature plus a low brittle point. Resistant to many oils, solvents and corrosive chemicals. Very light - Sp. Gr. 1.01 . . . dimensionally stable . . . soluble in selected solvents for potential coatings applications. Readily injection-molded.

GET THE FACTS — *Write* TODAY FOR TECHNICAL LITERATURE

Marbon

MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

MARBON . . . Precision Resins for Precision Made Products

IT'S YOUR CHOICE



MAKE IT COUNT!

Now with ***greatly reduced prices*** choose
HARCHEM'S SEBACIC PLASTICIZERS
Unsurpassed Stability
Dependable • Uniform • Highest Quality

Newly reduced prices of Sebacates now make it possible to incorporate their well known superlative features into your product.

Low Temperature Flexibility • Permanence
High Efficiency • Heat and Sunlight Resistance

BINNEY & SMITH CO. • Distributor to the Rubber Industry

HARCHEM

25 MAIN ST., BELLEVILLE 9, NEW JERSEY

THE KEY TO HARCHEM® BETTER PLASTICS

HARDESTY CHEMICAL DIVISION
W. C. HARDESTY CO., INC.

Manufacturers of Sebacic Acid

Canadian Distributor: W. C. Hardesty Co. of Canada Ltd., 975 Lakeshore Road, New Toronto, Canada

When you buy Blacks

UNITED
CARBON COMPANY, INC.

Kosmos 60 is an HAF black with the proper appeal. It is made right and therefore has the quality and uniformity which compounders prefer.

Kosmos 60 mixes readily, processes well, tubes to satisfaction and cures tight. It adds real strength and imparts superb resistance to wear and flex. It ages well.

Kosmos 60 gives the performance and durability currently demanded of stocks subjected to severe service.

For a lasting enviable reputation let United blacks serve as the backbone of your rubber goods.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, WEST VIRGINIA

NEW YORK AKRON CHICAGO BOSTON MEMPHIS

Septe

It's NEW and it's WONDERFUL!

Marbon "8000-A"®

Reinforcing High Styrene Resin

Enjoy New, Improved, Economical Processing at Lower Temperatures and Shorter Banbury Mixing Cycles!

Marbon "8000-A" resin fluxes rapidly at lower temperatures (165-175 degrees F.) for improved dispersion, shorter mixing cycles, faster heat-plasticizing action with lowered power demand. A superior-processing resin with all the reinforcing properties of Marbon 8000. Especially suitable for OPEN-MILL mixing under marginal heat conditions.

WRITE *Today* FOR COMPLETE TECHNICAL LITERATURE

Marbon

MARBON CORP.

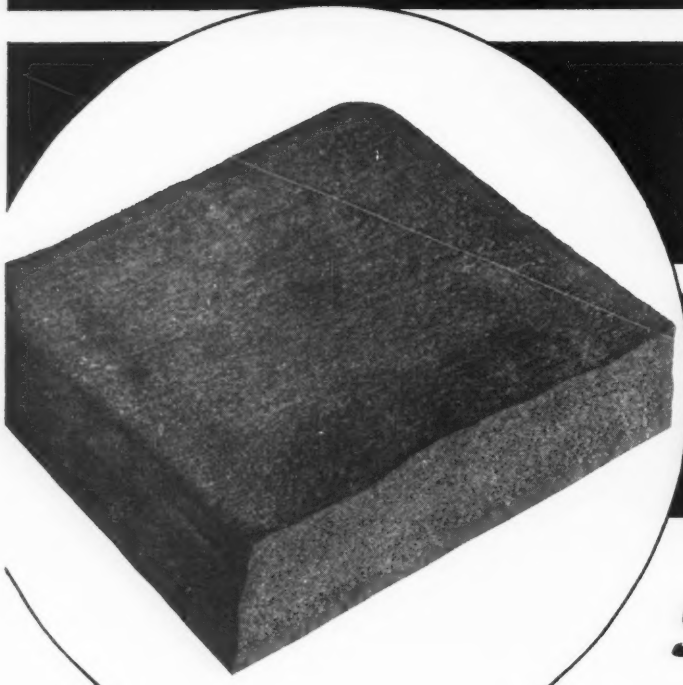
GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

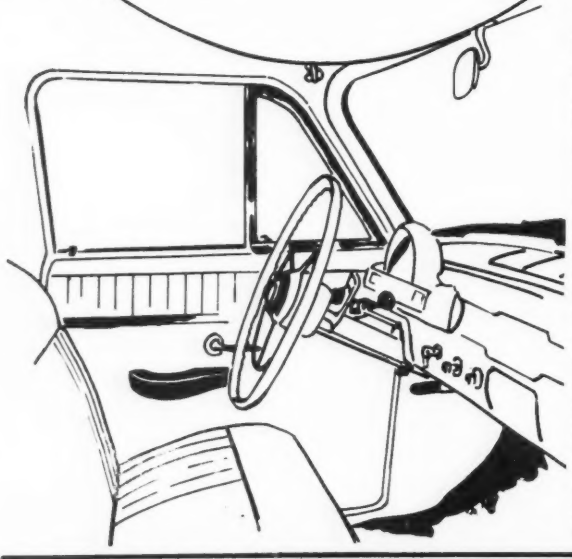
Have you tried

BUTYLITE #5950



BUTYL RECLAIM

for Sponge Rubber?



A typical formula for Automotive Sponge Applications (Armrests, etc.) is as follows:

FORMULA A-380-6

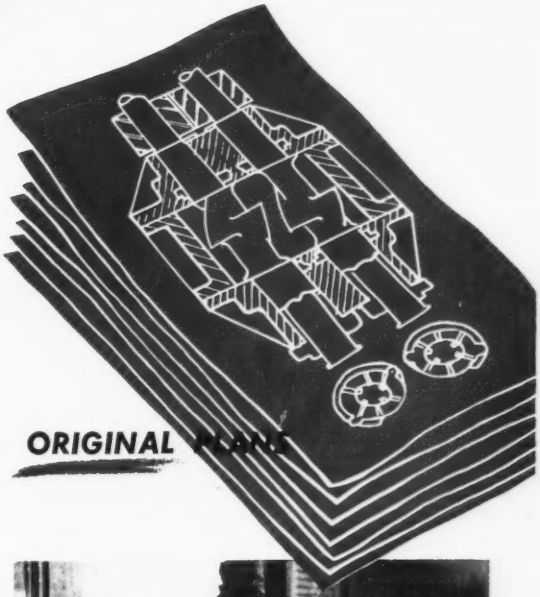
GRI 18	19.8
PEQUANOC BUTYLITE #5950 RECLAIM	**34.6**
Zinc Oxide	2.4
Stearic Acid	1.6
Sodium Bicarbonate	2.4
Talc	6.4
M. T. Black	6.4
Light Process Oil	23.6
Sulfur	1.6
T M T D S	.8
Zenite	.4
	100.00

Material Cost Per Lb. . . . . 11.83¢
Cure 1" Slab 20 Minutes @ 320° F.
.25 oz./cu. in.—.35 oz./cu. in.

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

WHY ONLY THE MANUFACTURER CAN MAKE "GOOD AS NEW" BANBURY* REPAIRS



Every Banbury* mixer that leaves our shop after rebuilding carries a new machine guarantee. This guarantee provides assurance that the rebuilt machine will be "as good as new" when it is returned to service. How can we do this?

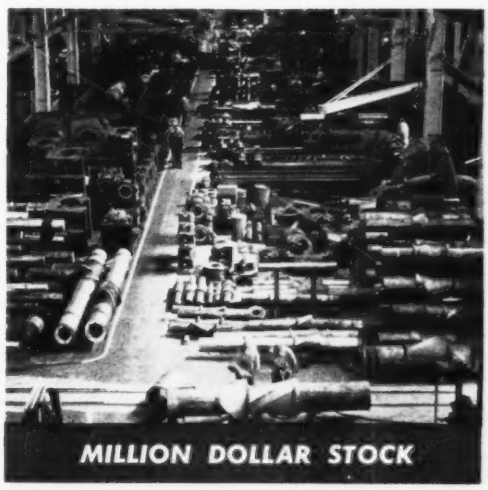
As the sole manufacturer of the Banbury mixer for thirty-six years, Farrel-Birmingham has unequalled experience, facilities and know-how to return a worn machine to its original work capacity. Furthermore, a Banbury rebuilt by us benefits from a product-improvement research program that has been continually carried on during the entire period that we have manufactured over 2,000 of these machines. Modern features of design and improved materials can now be incorporated into a machine being rebuilt, the same as in a new one.

Farrel-Birmingham is the only company having complete drawings showing the original dimensions of every part of the Banbury mixer. This is essential information for correct and precise work in rebuilding these machines. When a part is worn, blueprints show the Farrel-Birmingham engineer just how much rebuilding is required to return the part to its original size, contour and work efficiency. There is never any guesswork.



Farrel-Birmingham is the only company having complete jigs, fixtures and gauges necessary for satisfactory repairs. 242 of the pieces of a new Banbury have to be machined, calling for a total of 882 operations to finish. The use of our special equipment and facilities assures both accuracy and quick service in rebuilding work. Service is further facilitated by the largest existing stock of standard parts and complete new bodies.

A letter, phone call or wire to one of the offices listed below will bring an inspector to your plant, promptly and without cost. He will examine your machines thoroughly, report to you on their condition, and recommend what has to be done to make them "new again."



FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN. (Ansonia 4-3331)
AKRON, OHIO, 2710 First National Tower (POrtage 2-8871)
CHICAGO, ILLINOIS, 120 So. LaSalle St. (ANdover 3-6434)
LOS ANGELES, CALIF., 2032 Santa Fe Avenue (Lafayette 3017)
HOUSTON, TEXAS, 860A M&M Building (CApitol 6242)

Farrel-Birmingham®

FB-946

*Trade Mark

MILLEX

LOW COST
LOW GRAVITY



Compounding Ingredient for Rubber and Rubber-Like Materials!

PROPERTIES

Physical Form	Friable solid
Color	Brown
Specific Gravity	1.04
Melting Point	250° F. (approx.)

MILLEX is a selected Gilsonite base product specially compounded to render it readily miscible with rubber and rubber-like materials.

MILLEX is recommended for use in wire insulation, tapes, soles and heels, boots and shoes, and extruded goods, cured in air or open steam. It is also recommended as a low cost, low gravity extender for semi-rigid vinyl resin compounds.

COMPOUNDING CHARACTERISTICS:

In GR-S, natural or reclaimed rubber, MILLEX improves processing and flattens stocks without undue softening before, during and after cure. Thereby smooth tubing and calendering and clean embossing are obtained. Freedom from flow and sagging in open cures is also enhanced. Good mill release and freedom from tackiness, particularly in high reclaim stocks, are obtained with MILLEX.

Cured stocks show good hardness, modulus and extremely smooth finish. Electrical behavior is excellent and moisture absorption is low.

MILLEX is compatible with vinyl resins and lends itself to semi-rigid uses, such as records, chemical resistant conduits, flooring, paneling, etc.

MILLEX while dark brown in color has relatively low hiding power and can be used for light brown or tan colored compositions, such as soles or heels.

MILLEX should be added directly to GR-S or rubber during breakdown period for best results.

Write for Literature and Working Samples

Cary Chemicals Inc.

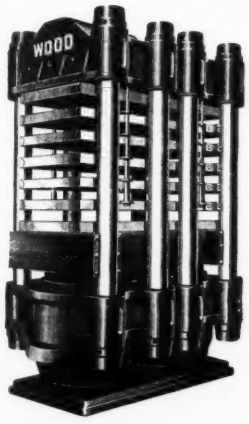
Successors to BURGESS CHEMICAL CO.

Executive Sales Offices: 64 HAMILTON STREET, PATERSON 1, NEW JERSEY
Laboratory & Plant: RYDERS LANE, MILLTOWN, NEW JERSEY

CARY CHEMICALS PRODUCTS:
- Vinyl Compounds
- Vinyl Plasticizers
- Vinyl Resin
- Reclaiming Oils
- Sun Checking Agents
- Esters
- Stearine Pitches



How long are nine lives?



The amazing ability of cats to survive what might be called "punishing service conditions" has given rise to the 9-life theory. How long a period this is nobody really knows. That's the way it is with R. D. Wood hydraulic presses . . . their life seems limitless, too. Some of them are scarcely beginning to draw their second wind after 25 years in service. Others are still going strong at 50. What every owner knows for certain about his R. D. Wood presses is that they have no trouble outliving the time needed to earn the original investment . . . and then some. An informative catalog is available.

IN RUBBER AND PLASTICS, THE PAYOFF'S AT AN R. D. WOOD PRESS LIKE THIS ONE!

This 1,327-ton multiple-opening hydraulic press is used for the manufacture of molded brake lining and similar products. Can be furnished in various sizes and capacities to meet production needs. R. D. Wood presses are made for use in many industries. Ask for catalog, and for engineering aid—both yours without obligation.

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities


MAKERS OF HYDRAULIC PRESSES AND VALVES


FIRE HYDRANTS


CAST-IRON PIPE


GATE VALVES


GAS PRODUCERS


ACCUMULATORS



RC PLASTICIZER ODP

Now Readily Available in Bulk

This outstanding phthalate mixed ester plasticizer (iso-octyl iso-decyl phthalate), combines the excellent all-around performance of the usual phthalate esters with the following extras:

1. **Low Volatility!**
2. **Superior Water Resistance!**
3. **Improved Heat Stability!**

Check RC PLASTICIZER ODP for use in:

Film and Sheeting
High Hardness Plastisols
Electrical Extrusions
Fabric Coatings
Natural and Synthetic Rubbers
Molded Articles

RUBBER CORPORATION OF AMERICA ALSO SUPPLIES THESE OUTSTANDING PLASTICIZERS:

DIOP (DI-ISO-OCTYL PHTHALATE)

DOP (Di-2 Ethylhexyl)
DBP (Dibutyl Phthalate)
D-16 (Iso-Octyl Palmitate)
TG-8 (Triethylene Glycol Dicaprylate)
E-S (An Epoxidized Triester)
TG-9 (Triethylene Glycol Dipelargonate)
DIOA (Di-Iso-Octyl Adipate)
DOA (Di-2 Ethylhexyl Adipate)
DIOS (Di-Iso-Octyl Sebacate)
DOS (Di-2 Ethylhexyl Sebacate)

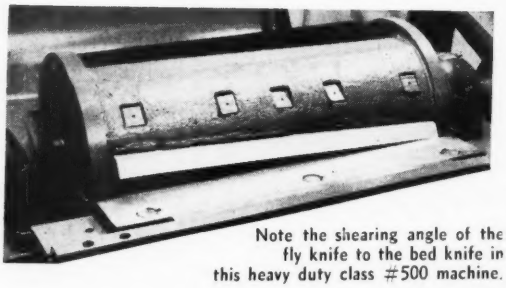
Write today for samples and brochure on RC products.

RUBBER CORPORATION OF AMERICA

New South Road, Hicksville, New York
SALES OFFICES: 111 West Monroe Street, Chicago 3, Ill. Little Building, 80 Boylston St., Boston 16, Mass. 2076 Romig Road, Akron, Ohio

TAYLOR-STILES CUTTERS

SHEAR CUT RUBBER and PLASTIC STOCK



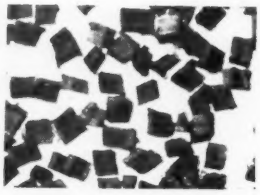
Note the shearing angle of the fly knife to the bed knife in this heavy duty class #500 machine.

All Taylor-Stiles Cutters

give a highly efficient shear cut.

Note the shearing angle of the fly knife to the bed knife in this heavy duty class #500 machine.

PELLETIZERS



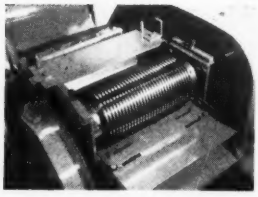
Various models are available for a variety of uses.

Accurate cutting, no longs or fines, in Taylor-Stiles cut plastics and rubber stock.

Knife discs cut stock into strips. Fly knife reduces them to pellets.

TANDEM CUTTERS

Two cutting units set at an angle to each other cut and cross cut sheet stock. (Used primarily for cellulose acetate and other hard stocks.)



Still other machines cut strips for feeding to extruders and another type cuts extruded rods into pellets.

•

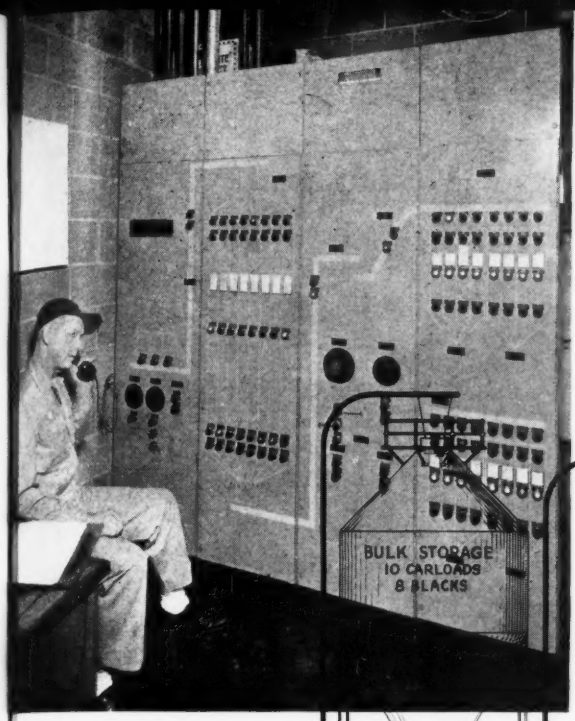
Write for full descriptions and advantages of these shear cutters. Sample cuttings will be made of your stock if you send us specifications of how you desire to have it cut.

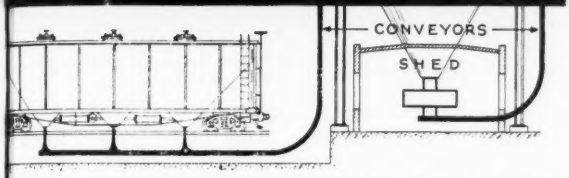
TAYLOR-STILES

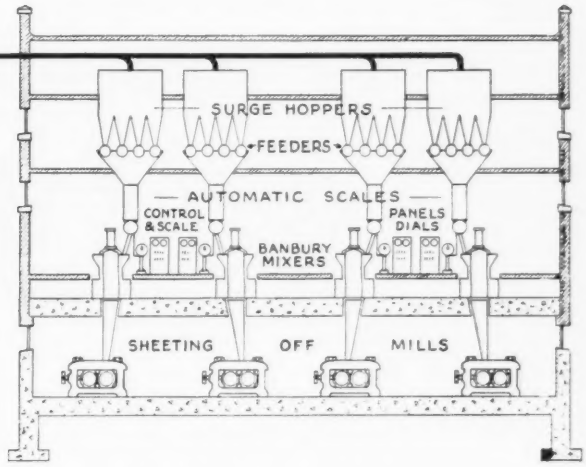
& COMPANY

16 Bridge Street, Riegelsville, New Jersey

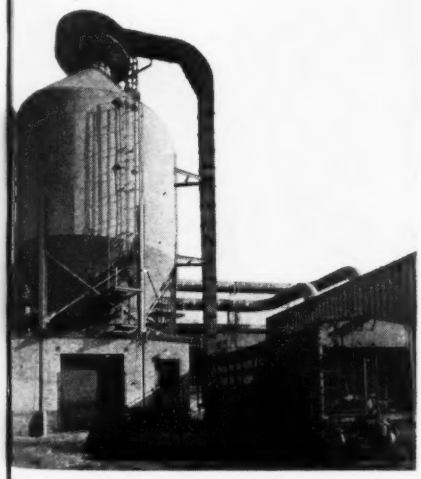
AUTOMATIC
bulk handling plant
FOR CARBON BLACK



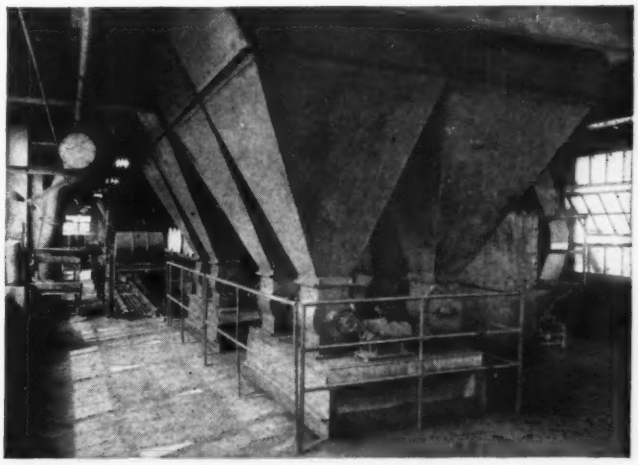




Operator can route black from railroad car to any one of eight sections in the bulk storage, then from storage to any one of 16 surge hoppers over four Banbury Mixers. Such equipment can be adapted to any type of resins or ingredients where bulk shipments are desirable.



his illustrates conveyor lift between a railroad car d 8 compartment bulk storage.



Surge hoppers over Banbury Mixers. An operator at the Banbury Mixer sets his weigh scale for the exact amount of black required. He also sets the control and puts into operation a feeder that serves to select the type of black needed.

Carbon black moves from railroad cars to xers without a human hand touching the terial. Automatic controls elevate, convey d weigh the black into mixers. Their versatile stem stores several kinds and types of black carload lots . . . thus you have a variety of cks available at each mixer. Push buttons master control board route each black to its per distribution.

or a complete plant; a specialized process; an neering service or individual machines for rubber plastic, write Hale and Kullgren, P. O. Box 1231, on, Ohio.

Sales and Engineering by

HALE and KULLGREN, INC.

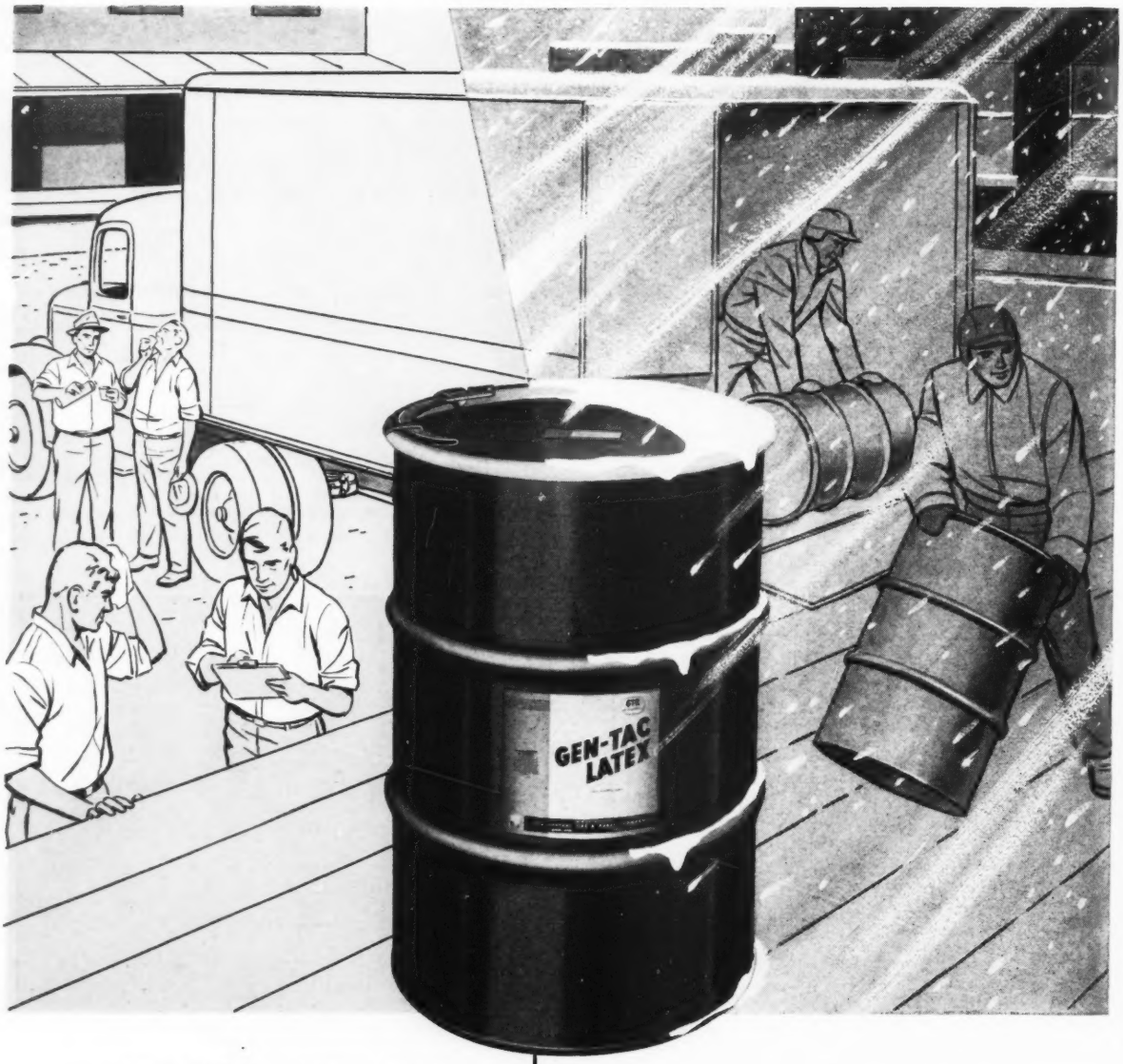
P. O. Box 1231 · AKRON, OHIO

MANUFACTURED BY

THE AETNA-STANDARD ENGINEERING CO., PITTSBURGH, PA.

PLANTS IN WARREN, OHIO ELLWOOD CITY, PA.

Announcing—



KURE-BLEND® MT MASTERBATCH.
50% TETRAMETHYL THIURAM DISULFIDE AND 50% GR-S TYPE RUBBER

- Fast, easy mixing
- Excellent dispersion
- Dust-free
- Accurate weighing

KO-BLEND® I. S. INSOLUBLE SULFUR.
50% CRYSTEX AND 50% GR-S TYPE RUBBER

- Controls sulfur bloom
- Eliminates discoloration of light stocks
- Insures good dispersion
- Cuts milling time

Freeze-Stabilized GEN-TAC* Latex

We are proud to announce another first of real significance to the rubber industry . . . Freeze Stabilized Gen-Tac Latex. Through this important development, it is now possible to make shipment of Gen-Tac in temperatures down to 0° F. If the Gen-Tac is frozen by exposure to such temperatures, it will recover to its normal state upon thawing.

Our Research Laboratories have had drums of Freeze Stabilized Gen-Tac stored in the open continuously since September, 1952. The Latex is in perfect condition, and the bonding strength is as high today as that of freshly made Gen-Tac which has not been stabilized.

No change has been made in Gen-Tac other than the incorporation of the unique stabilization system, so Freeze Stabilized Gen-Tac may be used as a replacement for, or interchangeably with standard Gen-Tac. It has been thoroughly tested by our Tire Development Department and is now being used as standard production material.

General's Gen-Tac offers the additional exclusive advantage of freeze-stabilization at no added cost. For further information on Freeze Stabilized Gen-Tac or other General Tire Chemical Products, just fill out the coupon below.

*T. M. G T & R Co.

Creating Progress Through Chemistry

Chemical Division
GENERAL
THE GENERAL TIRE & RUBBER CO.

GEN-TAC

The General Tire & Rubber Company, Chemical Div.,
1708 Englewood Ave., Akron 9, Ohio

Send literature on ☐ Gen-Tac
☐ Ko-Blend ☐ Kure-Blend

Send sample of
☐ Gen-Tac ☐ Ko-Blend ☐ Kure-Blend
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RW-9-54

FOR RUBBER COMPOUNDING, INVESTIGATE

VELSICOL

RUBBER PROCESSING HYDROCARBON

RESINS

Available in Varied Melting Point Ranges

- Compatible with natural and synthetic rubbers.
- Effective plasticizers and softeners.
- Improve milling, calendering and tubing characteristics.
- Promote excellent physical properties.
- Excellent dispersing agents for fillers and pigments.
- Possess high electrical resistance properties.

SOME SUGGESTED APPLICATIONS

MECHANICAL GOODS
RUBBER SOLES AND HEELS
RUBBER FLOOR TILING
TUBULAR COMPOUNDS
MOLDED RUBBER PRODUCTS
ELECTRICAL INSULATION COMPOUNDS
RUBBER ADHESIVES AND CEMENTS
RECLAIMED RUBBER SHEETING
GASKETS AND JAR RINGS
COLORED RUBBER STOCKS
HARD RUBBER COMPOUNDS
BATTERY CASES

FOR COMPLETE INFORMATION WRITE DEPT. HS

VELSICOL CORPORATION

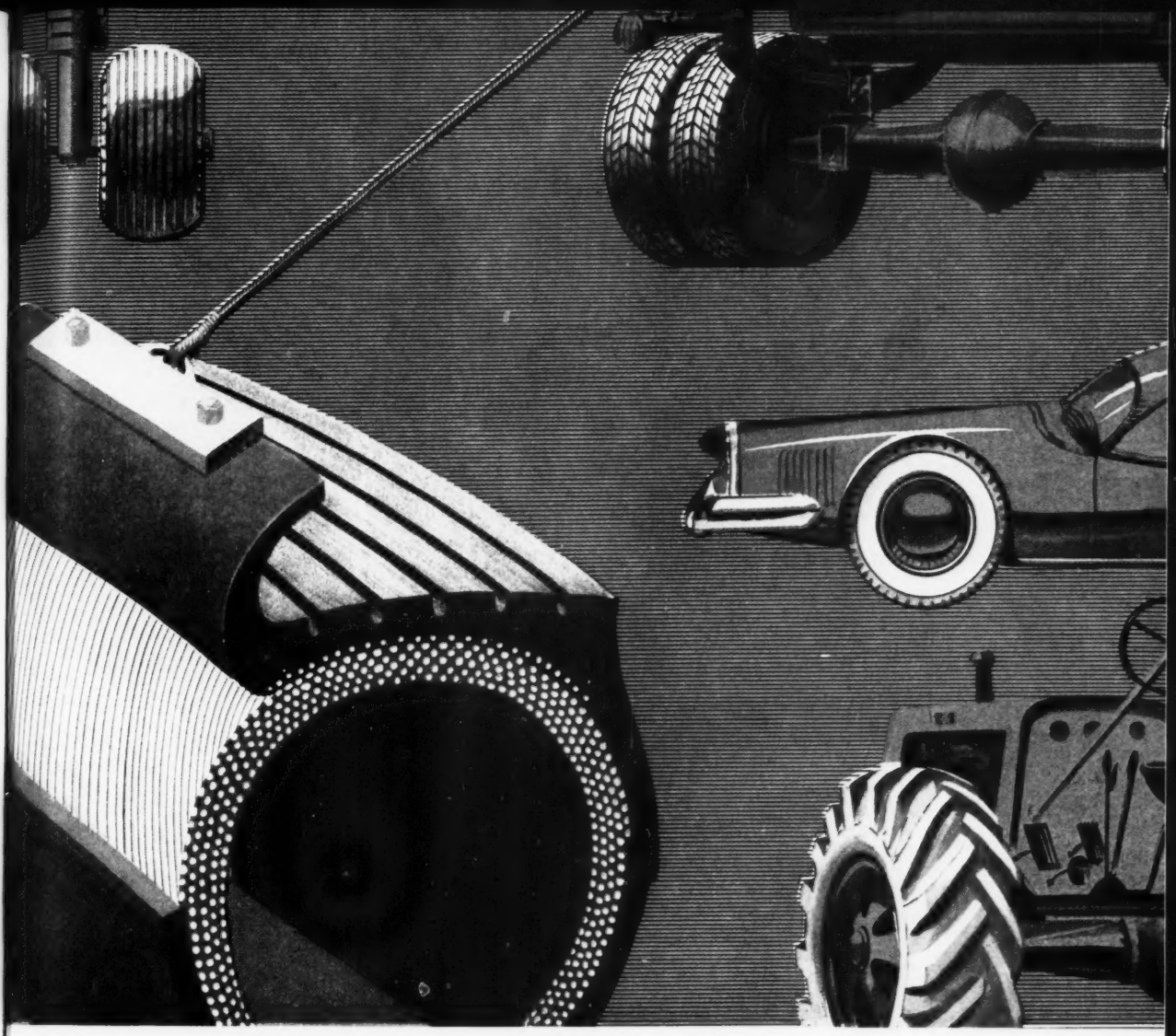
Division of Arvey Corporation

General Offices and Laboratories
330 East Grand Avenue, Chicago 11, Illinois

Export Division
100 East 42nd Street, New York 17, New York

REPRESENTATIVES IN PRINCIPAL CITIES

PETROLEUM DERIVED CHEMICALS
VELSICOL
SERVING BASIC INDUSTRIES



Up to 50% greater adhesion! *with* Pyratex

A tire's no tougher than the bond of cord to rubber. And new Pyratex, Naugatuck's special vinyl pyridine latex for tire cord treatment increases that bond up to 50%!

NEW PYRATEX . . .

- **secures rubber to fabric with a grip *stronger* than the stock itself**
- **keeps its outstanding adhesion even under high speed flexing and severe heat**
- **develops its adhesion more rapidly with cure**
- **greatly reduces "curing blows"**
- **has a higher solid content, for more convenient use**

Try Pyratex with your own stocks for automobile, truck, bus, and airplane tires, for V-belts and conveyor belts, *wherever* you need the strength of reinforced rubber without fatigue resistance and ply separation problems.

Developed by the same company that brought you the first natural latex for tire cord treatment, the first reclaim dispersion, and then GR-S plus Resorcinol, Pyratex is available for further compounding, or as a Lotol—custom-compounded and ready for use.

To find out more about how Pyratex can improve *your* rubber products, economically, write on your letterhead to the address below.

50th ANNIVERSARY 1904 1954 NAUGATUCK CHEMICAL

Naugatuck Chemical

139 ELM STREET
NAUGATUCK, CONN.

Division of United States Rubber Company

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario

RUBBER CHEMICALS • SYNTHETIC RUBBER • PLASTICS • AGRICULTURAL CHEMICALS • RECLAIMED RUBBER • LATICES

TRIM FLASHING in a Flash

and Clean as a Whistle!

Western's RMH Machine

cuts the cost of trimming as much as 75%

a factory in a foot of space!



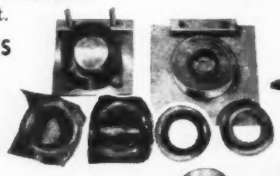
FEATURES: Cuts on replaceable hardened steel plate. Foot control speeds operation. Simple, positive pressure adjustment. ½ H.P. motor. Cutting area approx. 8½" x 9".

CUTS, PUNCHES and TRIMS in one swift operation!

DIES ARE OUR SPECIALTY

2 and 3 level dies are made for RMH. Change dies in just a few seconds with positive alignment.

FLASHING TRIM DIES
CLICKER DIES
WALKER DIES
I. D. and O. D. DIES
MALLET DIES
MACHINE DIES





POSITIVE SAFETY FEATURES

Machine *cannot* trip accidentally. Operator can view entire operation.

GET THE FULL STORY on Western Machines and Dies by sending for our free illustrated catalog today.



SEND SAMPLES of parts to be cut and flash trimmed for our recommendations.

For Versatility— "GO WESTERN"

Western SUPPLIES CO.

2920 CASS AVE., ST. LOUIS 6, MO.



Specialized grades for all types of

RUBBER AND RUBBER GOODS

Piccoumaron Resins offer many advantages in the manufacture of a wide variety of rubber goods, due to the compatability, chemical resistance, solubility and other desirable properties provided by these resins.

Piccoumaron Resins vary from liquids through viscous liquids, and tacky solids to high melting point, brittle solids, and in color from a deep reddish brown to a pale yellow shade. They are thermoplastic and do not become infusable on heating. Weight averages from 8.5 to 9.2 lbs. per gallon. In the higher melting-point grades they are quite resistant to oxidation.

Piccoumaron Resins have good acid resistance, being inert to all except strong concentrated oxidizing acids, and good alkali and salt resistance. These resins have an acid number of approximately zero, and do not react with most pigments.

How To Use Piccoumaron Resins

Softer grades (see table below) are used to give tack to rubber, especially for ply operations. The very soft grades are used as both softeners and plasticizers for rubber, allowing easy incorporation of pigments and fillers, and a smooth stock, milling readily.

For hard rubber goods, where increase in hardness and a leatherizing action are desired, Piccoumaron Resin XX-100 has been very successful. For tubular goods and various extrusion processes the 420 and 450 have proven very valuable, and for mechanical goods, toy materials, and the like, the 422, 425 and 457 are used.

In gaskets, jar rings, rubber belting and the like, the 420 and XX-100 grades are employed.

Picco 10 and 25 should be used where high plasticities are desired. Where high tensile strength is needed, use the 420-S and XX-100.

Large amounts of Piccoumaron Resins are used with rubber stocks in the manufacture of rubber soles, rubber heels and rubber footwear.

Rubber stocks compounded with Piccoumaron types of resin age well, and retain a desirable tack in storage before vulcanization.

Write for samples and complete details.

NUMBERING SCHEDULE PICCOUMARON RESINS

	COLOR	Light 1½-3½	Medium 4-6	Reddish 6-9	Dark 9-12	Extra Dark 12-16	Extra Dark 12-16
MELTING POINT	Liquid Resin	459	429	449	469	439	
	10°C— 15°C	458	428	448	468	438	XX-10
	30°C— 35°C	457	427	447	467	437	XX-25
	40°C— 45°C	456	426	446	466	436	XX-40
	50°C— 55°C	455	425	445	465	435	XX-55
	65°C— 70°C	453	423	443	463	433	XX-70
	80°C— 90°C	452	422	442	462	432	
	95°C—105°C	450	420	440	460	430	XX-100
	110°C—120°C	450H	420H	440H	460H	430H	XX-115
	120°C plus	450EH	420EH	440EH	460EH	430EH	

SPECIAL GRADES—Special grades of Piccoumaron Resins can be made when required.
The colors shown are on the Coal Tar Resin Color Scale. The melting points are by the ball and ring method.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA
***Plants at:* Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.**
***District Sales Offices:* New York, Chicago, Philadelphia, Pittsburgh**
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for (application)_____

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Company_____

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a **non-staining** antioxidant



STABILITE WHITE*

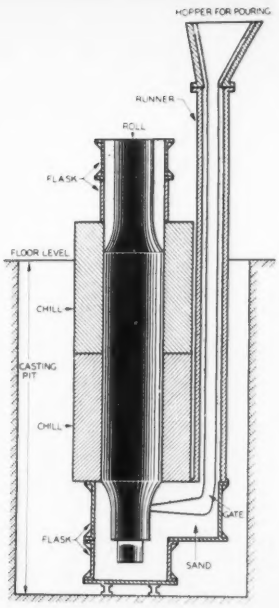
STABILITE WHITE is a mobile liquid NON STAINING antioxidant showing maximum age-resisting properties. It combines ease of handling and processing, sun-light and flex-check resistance and at the same time possesses the ultimate in non-staining characteristics. When these properties can be obtained with no increase in compounding costs, the far-seeing compounder will convert his recipes to include **STABILITE WHITE**. Try it in ***your*** compounds — crude rubber, synthetic or natural latex.

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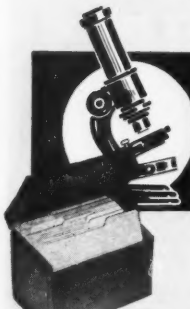
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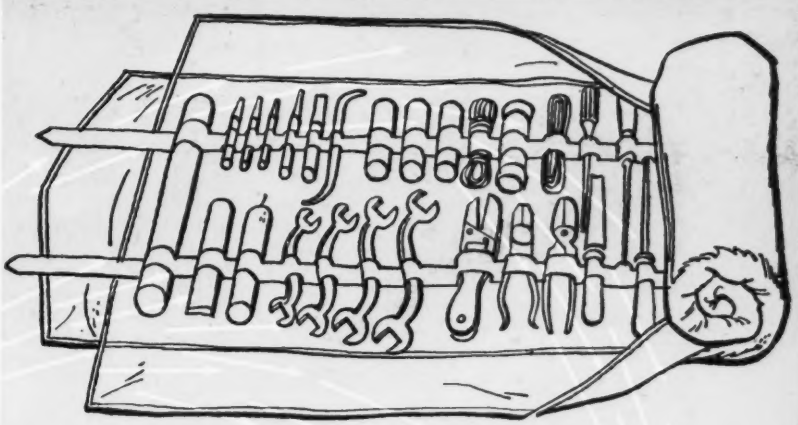
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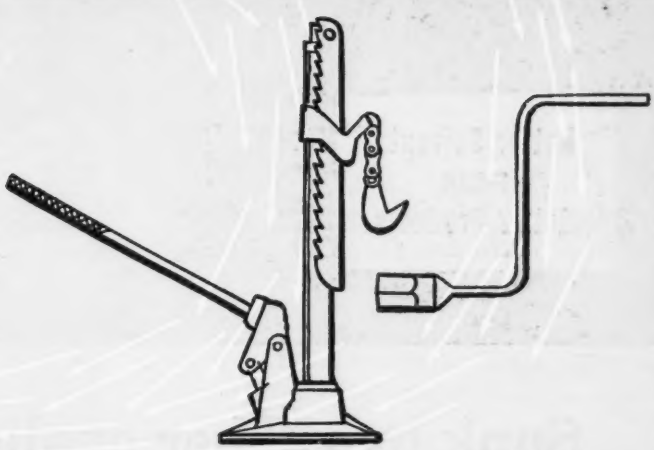
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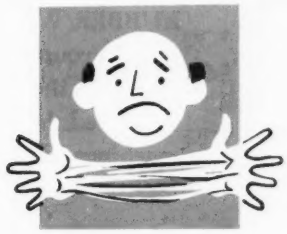
Technical facts in complete detail are yours for the asking. Write today. And for special help on solvent application problems, consult with the Skellysolve Technical Fieldman. No obligation.

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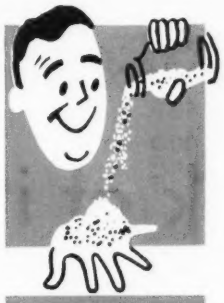
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If you think Silene EF can be useful in your operations . . . we shall be happy to supply you with experimental quantities and offer our technical assistance.

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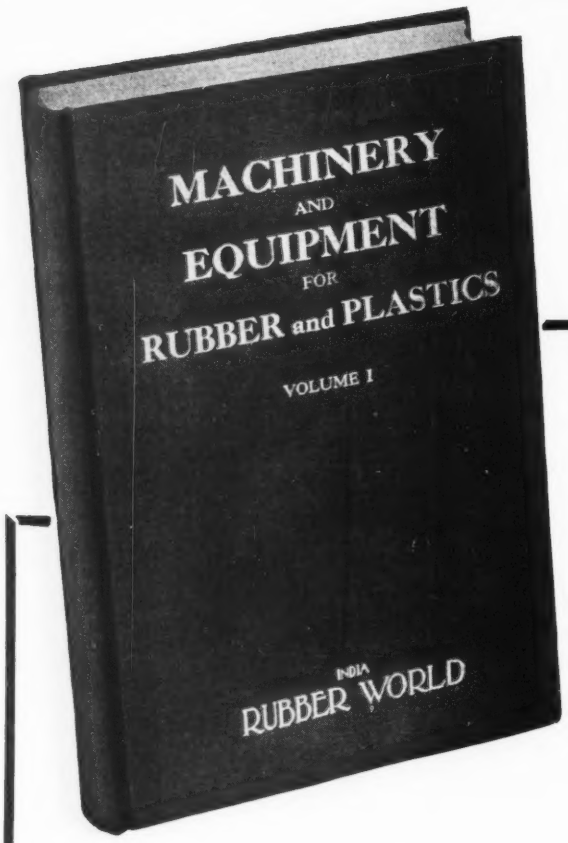
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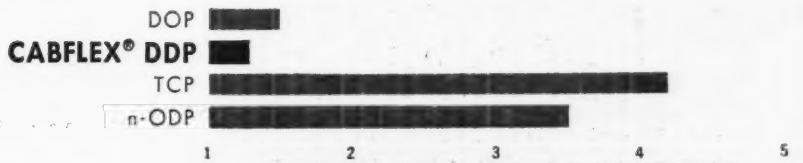
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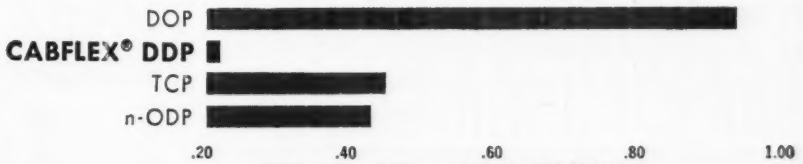
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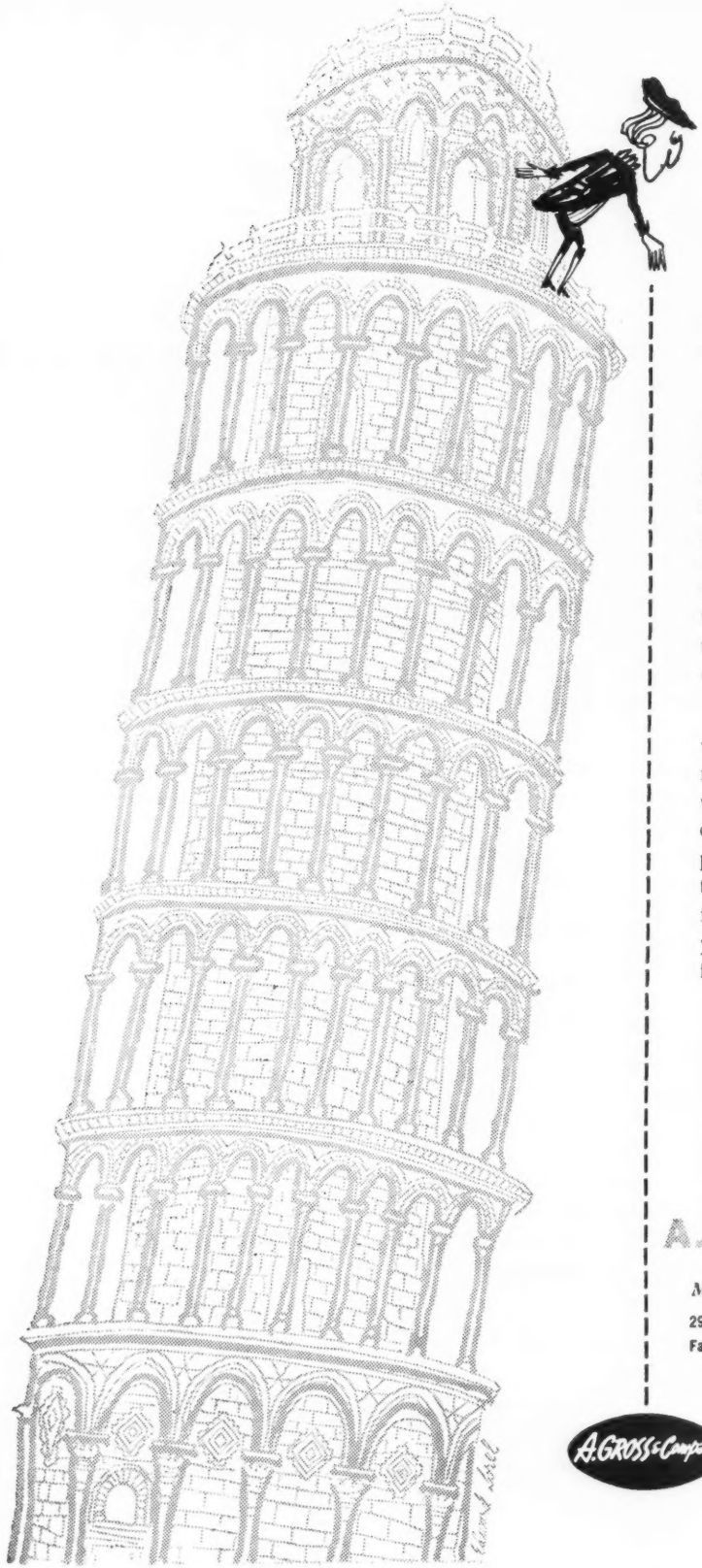


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Unsaponifiable	1.5% max.
Saponification Value	197 — 200
Acid Value	196 — 199
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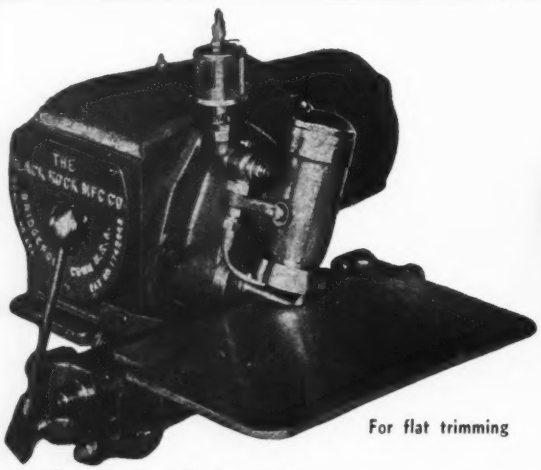
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DUTREX 20

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For Neoprene WHV

DUTREX 6

DUTREX 20

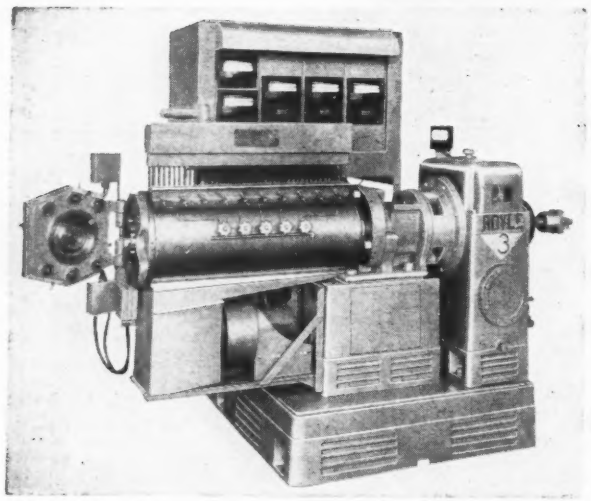
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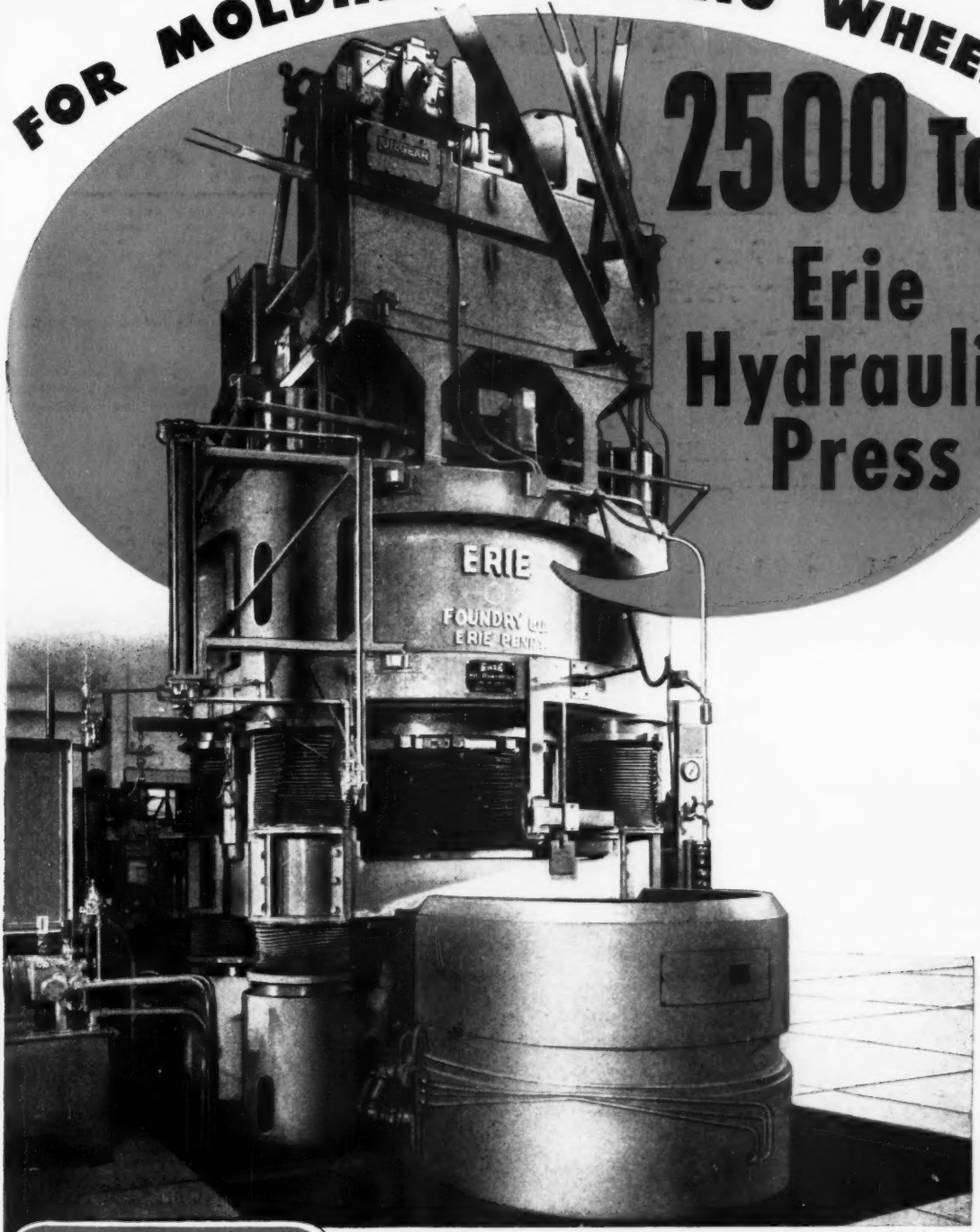
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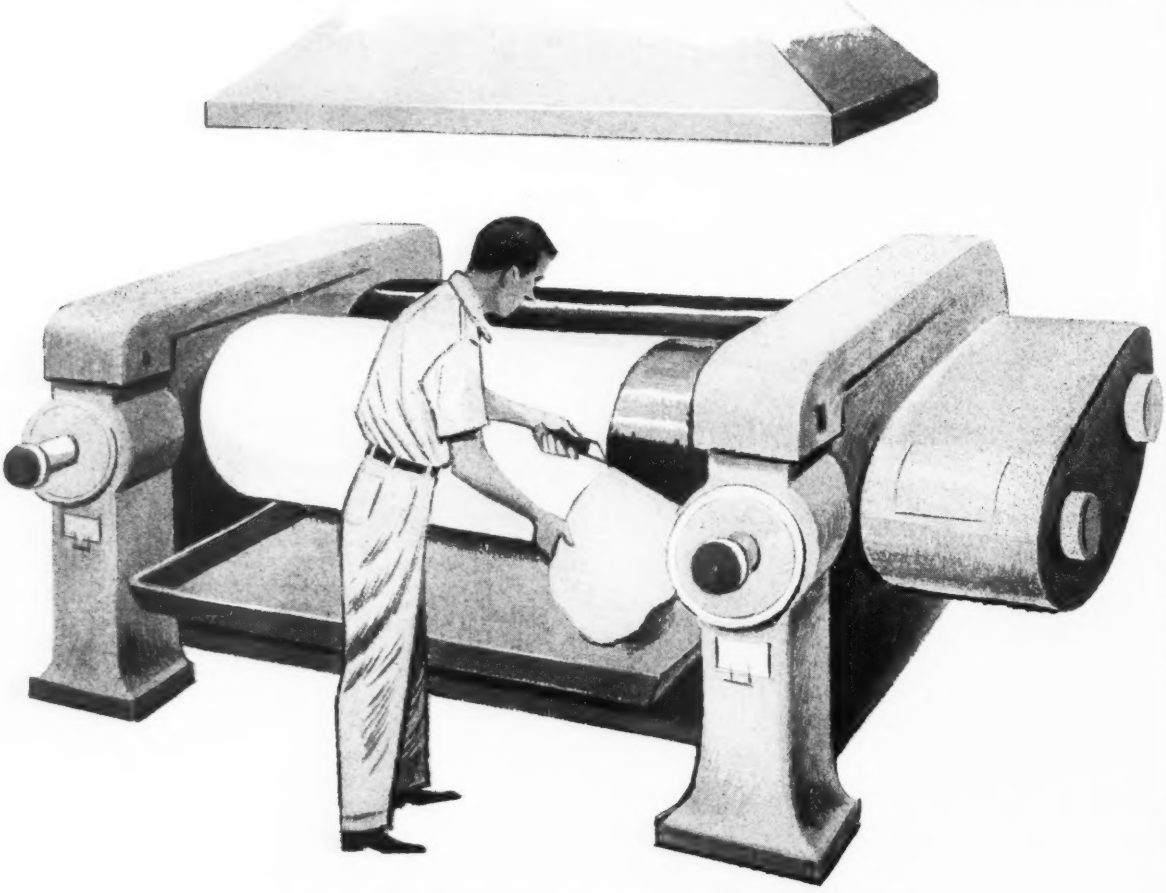
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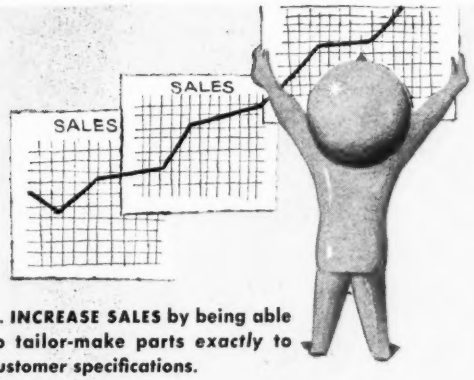
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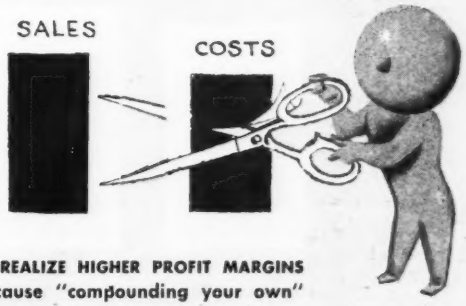
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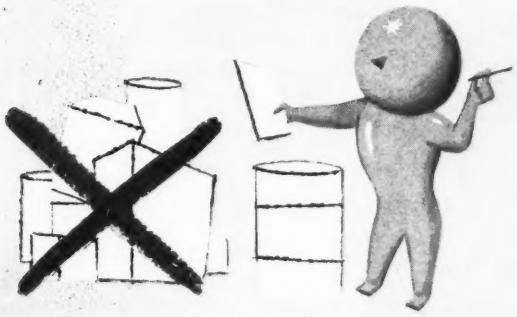
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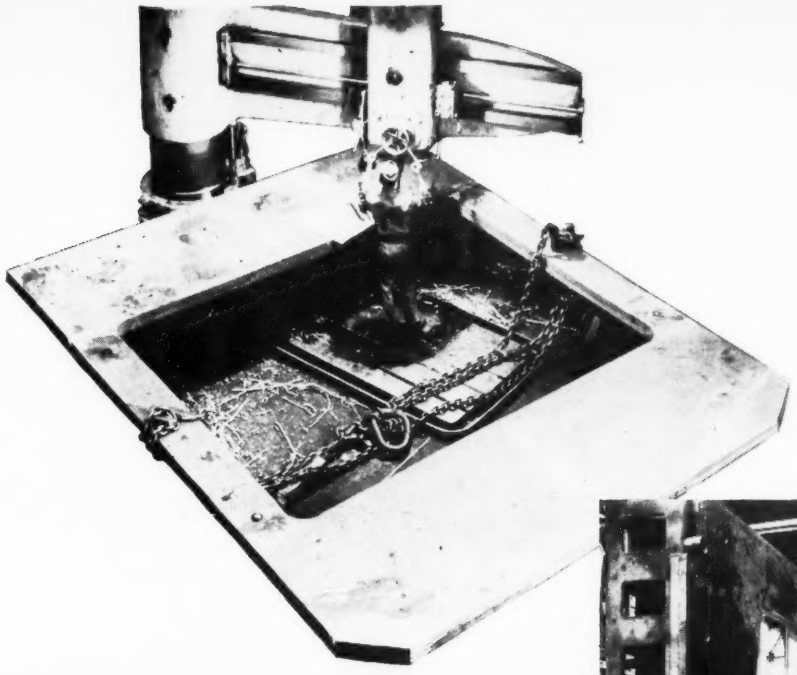
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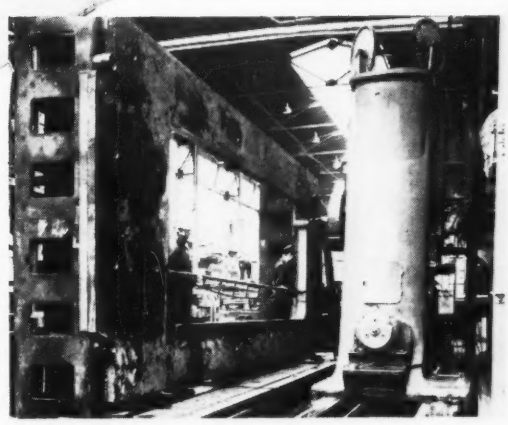
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Editorials

What about Synthetic Rubber Specifications after Disposal?

A PROBLEM which requires early consideration by the rubber industry in the United States is what to do about the specifications for general-purpose synthetic rubber established under the Government Synthetic Rubber Program, after the producing plants have been disposed of to private industry. These specifications, which included not only values for chemical and physical properties of the several grades of synthetic rubber, but also methods of test, resulted in an enviable degree of uniformity in the rubber supplied to the consumer.

Under private industry operation, centralized administration and control of synthetic rubber production by these specifications will be absent, and each company will be free to produce rubber according to its own ideas of uniformity of physical and chemical properties. Also, the consumer may have not one, but several producer specifications for use with a given grade of rubber if he wishes to check the properties of shipments received from more than one source of supply.

It may be that no overall specifications for each of the several types and grades within types of synthetic rubber will be required. No such specifications were ever demanded by the consumer for the 10,000 to 15,000 tons a year of nitrile type rubber produced by private industry during the last 15 or more years, or for the 50,000 to 60,000 tons a year of neoprene produced privately during the last five or more years since the production of this latter rubber became a private industry operation.

On the other hand, when upwards of 600,000 tons of GR-S type synthetic rubber and 70,000 tons of Butyl type synthetic rubber a year are added to make a total of 800,000 tons a year or more of the many types and grades of synthetic rubber being sold by possibly 20 different companies, consumer demand for specifications may be more pronounced.

Since 1949 the natural rubber producing industry through its work with Technically Classified Rubber has been trying to improve the competitive position of natural rubber with relation to synthetic rubber by developing specifications for both producers and consumers similar to those that have been available in the United States for several years. T. C. Rubber provides additional technical information on commercial grades established by The Rubber Manufacturers Association without changing these grades.

Real and anticipated consumer demand motivated the natural rubber industry to undertake the development of T. C. Rubber. It is expected that a similar demand will encourage the continuation of overall specifications for synthetic rubber.

The American Society for Testing Materials through a subcommittee 12 of its Committee D-11 on Rubber has been working with the natural rubber industry in connection with specifications for natural rubber, including T. C. Rubber. This same ASTM Committee D-11 has recently approved the formation of a new subcommittee on synthetic rubber in order to be prepared to handle the work on existing specifications, when and if United States synthetic rubber production becomes a private industry operation, and overall specifications are desired by the industry.

It is expected that disposal of the government's synthetic rubber plants will take place during the first half of 1955. A sampling of industry opinion on this matter of overall specifications for synthetic rubber, preferably by the Rubber Facilities Disposal Commission, and a decision and recommendation in this connection should be a part of the Commission's report to the President and Congress on or before February 1, 1955.

R. G. Seaman

Carboxylic Hycar Latex—A New

By H. P. Brown[2] *and* N. G. Duke[3]

CARBOXYLIC nitrile rubbers prepared from carboxylic bearing monomers combined with butadiene and acrylonitrile develop high tensile strengths particularly apparent in the vulcanizates of pure gum stocks and latex films. Equivalent cures may be obtained without sulfur by the use of polyvalent metal oxides or salts.

Carboxylic nitrile rubbers do not require reinforcing pigments for high tensile strengths.

Two carboxylic nitrile latices are commercially available, and their properties suggest many possible uses in the paper, leather, and textile industries.

The dry rubbers are not available at present and are not anticipated on a commercial scale in the near future.

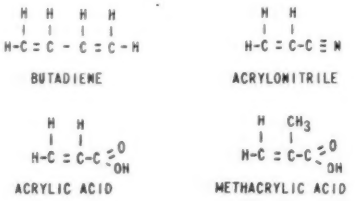
NITRILE rubbers are well known and widely accepted in industry for uses where excellent resistance to various oils is required. In more recent years many uses have been found for nitrile rubbers, especially in the latex form, where oil resistance is not important or is of only secondary interest. Such uses are exemplified by the use of these nitrile rubbers and latices as a non-extractable plasticizer for vinyl resins, blends with phenolic resins to give high-impact molding resins, as a major constituent of many adhesives, a binder for pigments in leather, paper, or textile applications; as a saturant to give paper of high strength and quality; and as a binder for non-woven fibers. These applications take advantage of the many other important properties of nitrile rubbers such as compatibility with other materials, abrasion resistance, water resistance, and high adhesive strength and bonding power.

In this paper we shall discuss carboxylic nitrile rubbers which possess additional interesting properties including exceptionally high tensile strengths.

Polymer Structure

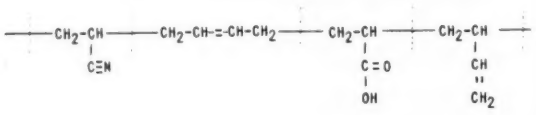
Nitrile rubbers are copolymers of butadiene and acrylonitrile. The carboxylic nitrile rubbers considered in this study contain, in addition, one or more acrylic-type acids as part of the comonomer system.

MONOMERS USED IN CARBOXYLIC NITRILE ELASTOMERS



The polymerization of these monomers produces a chain similar to a normal nitrile rubber except for the carboxyl groups which are distributed along the chain.

SKELETAL REPRESENTATION OF A CARBOXYLIC ELASTOMER STRUCTURE



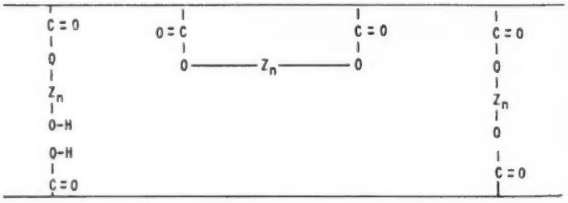
In the polymers and latices described in the applications of this paper, carboxyl groups occur with a frequency of the order of one to every 200 to 100 carbon atoms of the polymer chain. Thus there are many more nitrile groups than carboxyl groups. The segments represented in the above are for illustration only and should not be interpreted as representing the molecular composition of polymers in this study.

Mechanism of Vulcanization

The carboxylic nitrile rubbers are versatile and unique in that they can be cured or vulcanized by reactions of the carboxylic group as well as normal sulfur-type vulcanization.

One method of curing is to cross-link the chains by neutralizing the carboxylic groups with the oxide or salt of a polyvalent metal. The Zn^{++}, Ca^{++}, Pb^{++}, Mg^{++} ions are all capable of effecting such a vulcanization reaction. Possible linkages due to the zinc oxide cure are shown below.

LINKAGES POTENTIALLY PRESENT IN ZINC OXIDE VULCANIZATES OF CARBOXYLIC ELASTOMERS



Since the polymer chains contain double bonds such as occur in butadiene-nitrile rubbers, the normal types of sulfur vulcanization can also be employed. However, since most sulfur curing systems also include zinc oxide, the vulcanizate is likely to be that of a combination of the two curing systems. The metal oxide and sulfur curing systems are applicable to both the dry rubber and latex forms of the carboxylic nitrile rubbers.

Rubber Polymers[4]

The unvulcanized carboxylic nitrile polymers of this study possess physical properties essentially the same as those of analogous non-carboxylic polymers. The usual influence of modification upon polymer plasticity, gel content, and molecular weight was observed. Poly-

[1]Presented before the Rubber Division of the Chemical Institute of Canada, Toronto, Ont., Canada, June 23, 1954.
[2]The B. F. Goodrich Research Center, Brecksville, O.
[3]B. F. Goodrich Chemical Co., Cleveland, O.
[4]The carboxylic nitrile rubbers referred to in this section are not commercially available at this time.

High-Strength Elastomer[1]

mers of low gel content and Mooney viscosities, comparable to commercial Hycar nitrile rubbers, handle easier on the mill and more readily incorporate pigments than do polymers of higher gel or Mooney values.

Processibility

Conventional equipment and normal rubber handling techniques can be used to mix and process the carboxylic polymers. It should be remembered that zinc oxide or other metallic oxides are curing agents and should be handled with as much or more respect than sulfur is handled in conventional rubber stocks.

Carboxylic rubbers mixed with zinc oxide cure at room temperature on standing. Zinc oxide stocks are scorchy on the mill. Organic acids or organic acid anhydrides have been found to be retarders and "controllers" of the reaction of metal oxides.[5] As controllers, they materially increase the ultimate tensiles of the metal oxide vulcanizates and overcome evidences of precure such as poor flow of the stocks in the mold. As retarders, they prevent cure at room temperature and reduce Mooney scorch time to that of a normal nitrile rubber stock. Even though such carboxylic stocks are about the same with respect to scorch tendencies as normal nitrile rubber stocks, it is a desirable precaution to add the zinc oxide near the end of the mixing cycle. This is especially true if the stock tends to build up relatively high temperatures and requires long mixing cycles.

Properties of Metal Oxide Pure Gum Vulcanizates

One of the outstanding differences between the carboxylic nitrile rubbers and regular nitrile rubbers is that the carboxylic nitriles are capable of giving very high-strength stocks in pure gum recipes. The nitrile rubbers are almost entirely dependent upon reinforcing pigments for strength. A comparison of the two types of rubbers in pure gum formulations is shown in Table 1.

TABLE 1. COMPARISON OF PURE GUM PROPERTIES OF CARBOXYLIC AND NORMAL NITRILE RUBBERS

	Carboxylic Nitrile	Nitrile Hycar 1001
Rubber	100.0	100
Stearic acid	7.1	1.0
Zinc oxide	5.1	5.0
Thiuram Disulfide	—	3.5
	112.2	109.5
Cured 45 Min. @ 310° F.		
Tensile, psi.	3710	710
300% Modulus	630	270
Elongation, %	590	560
Shore durometer A hardness	65	47
*Graves tear, with grain, lbs. in.	290	63

*ASTM D624-48 using Die C.

This high gum strength is of more importance in latex applications than in dry rubber applications; nevertheless it may be of considerable utility in certain specialty applications.

The incorporation of carbon blacks does not increase tensile strengths of the metal oxide vulcanizates of the carboxylic polymers; the pigment merely acts as a loading agent.

Effect of Carboxyl Content on Polymer Vulcanizates Properties

The concentration of carboxyl groups in the carboxylic polymer may be expressed as equivalents of acid per 100 grams of rubber. This can be measured by titrating a solution of the polymer with a standard base and expressing the results as equivalents of carboxyl per 100 grams of rubber and will be abbreviated as ephr.

The effect of carboxyl content of the polymer on the properties of the metal oxide vulcanizate can be seen in Figure 1. As the carboxyl content goes from 0.01 ephr. to 0.05 ephr., the tensile strength of the zinc oxide cured stock containing no sulfur is increased from less than 500 psi. to 3,700 psi. Thus the tensile strengths of the zinc oxide vulcanizates are directly dependent on the carboxyl content of the polymer in the range of carboxyl levels included in this study.

Effect of Zinc Oxide Level on Vulcanizate Properties

In most conventional nitrile rubber cures the level of zinc oxide is relatively unimportant provided it is present at a level of one part per 100 of rubber or greater. Since it plays a more active role in the vulcanization of carboxylic nitrile rubbers, the level of zinc oxide is very important. The effect of zinc oxide level on tensile strength is very critical, as can be seen in Figure 2. As the zinc oxide level is raised stepwise from one phr., the tensile increases from 2,700 psi. to 8,400 psi. Very little improvement would be realized by further increase of zinc oxide. The best level of zinc oxide appears to be in the range of 1.5 to 2.0 ephr. zinc oxide for every ephr. of carboxyl.

In a recipe containing both zinc oxide and sulfur there are competing vulcanization reactions between the zinc oxide and the sulfur. The zinc oxide reaction is very fast, and high tensile strength is obtained in relatively

[5]United States patent No. 2,669,550, Feb. 16, 1954, to The B. F. Goodrich Co.

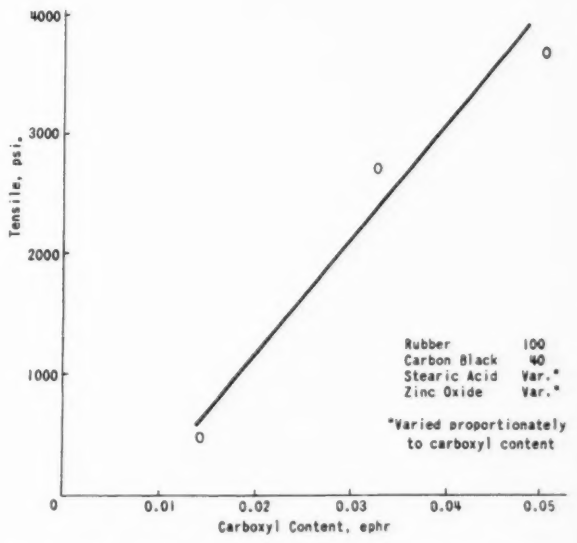


Fig. 1. Effect of Carboxyl Content of the Polymer on the Tensile Strength of the Metal Oxide Vulcanizate

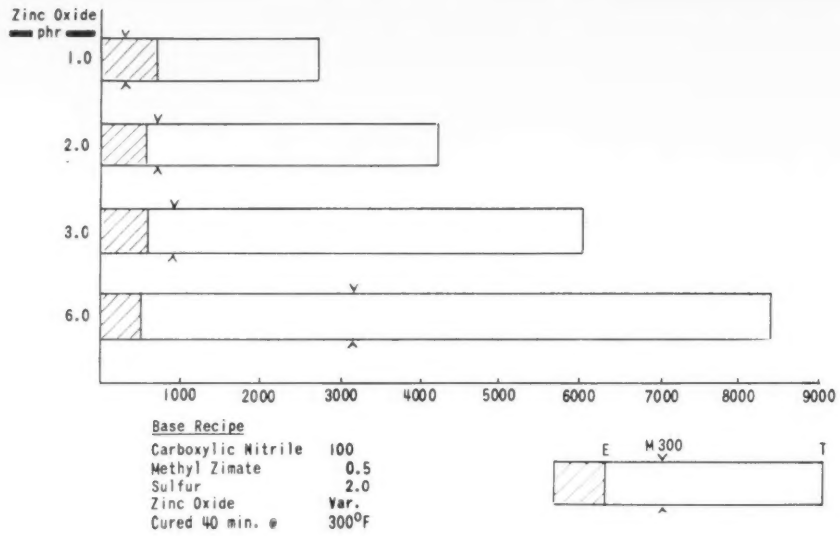


Fig. 2. Effect of Zinc Oxide Level on Physical Properties of Carboxylic Polymer Vulcanizates. (See Legend Lower Right-Hand Corner)

short curing times, compared to those for the sulfur reaction. If the curing cycle is increased, the slower sulfur cure begins to take over and results in a drop in tensile at the longer cure times.

Properties of the vulcanizate dependent on stress relaxation or compression set are very poor for zinc oxide cured stocks. This condition can be partially overcome by combining the sulfur and zinc oxide curing systems, but only at a sacrifice in tensile strength.

Carboxylic Hycar Latices

Physical and Chemical Characteristics

In describing the properties of the dry rubber forms of carboxylic nitrile rubbers it was impossible to refer to a commercially available polymer or even a pilot-plant source of supply. The polymers used were in the research or development stage only and subject to possible major changes before a marketable polymer is selected. The latex, however, is now available in commercial quantities under the trade names, Hycar 1571 and Hycar 1572. These latices have the characteristics which are shown in Table 2.

TABLE 2

	Hycar 1571	Hycar 1572
pH (approx.)	7 to 9	7 to 9
Particle size	1200 Å	600 Å
Specific gravity	1.00	0.99
Total solids %	38 to 42	38 to 42
Acrylonitrile content	High	Med. high

The pH range over which these latices are stable is quite broad, but for all practical purposes the latices should be adjusted to a pH of 9 with 10% aqueous ammonia in order to have satisfactory mechanical stability for compounding purposes. Ammonia is the recommended base for adjusting pH. In uses where ammonia is undesirable, such as in contact with copper equipment, tetra-sodium pyrophosphate may be used. Choice of the alkalinizing agent is critical to the stability of the latex.

Latex Film Properties

The carboxylic latices can be compounded with curatives such as zinc oxide, and films cast from these systems can be cured to give compounds of very high strength. It was also found that films produced by coagulant dipping techniques gave exceptional strength. To check the effect of coagulant on physical properties, cast films containing zinc oxide were air dried and then immersed into a coagulant for 30 minutes, rinsed with water for 30 minutes, and then cured 20 minutes at 220° F. The tensile increased over 2,000 psi. as a result of this treatment. Table 3 shows the effect of cure systems on physical properties and also compares Hycar 1571 with its normal nitrile counterpart, Hycar 1561.

TABLE 3. EFFECT OF CURE SYSTEM ON STRESS-STRAIN PROPERTIES OF HYCAR 1571 FILMS

	Hycar 1571 (Cast)			Hycar 1561
Curative System	None	Zinc Oxide	Zinc Oxide Butyl Zimate Sulfur	Zinc Oxide Butyl Zimate Sulfur
Tensile, psi.				
A	—	1950	2310	150
B	174	2150	3140	1700
C	285	4360	3110	
D		5000		
Elongation, %				
A	2000	830	700	1500
B	2000	860	570	600
C	2000	760	540	
D		700		

All films air dried
A—Cured at room temperature (3 days).
B—Cured 20 minutes at 220° F.
C—Cast films immersed into coagulant, then cured 20 minutes at 220° F.
D—Films formed by coagulant dipping.

Latex Applications

Dipped Goods

Because of the excellent physical properties that can be obtained with the latex films of these carboxylic nitrile latices, these latices should be of interest for preparation of latex dipped goods where oil resistance would be an advantage. Dipped goods might find industrial applications as rubber gloves, protective clothing, coatings, linings, or diaphragms where prolonged contact is encountered with petroleum oils, solvents, vegetable oils, or animal fats.

Leather Finishing

Hycar 1561 is used in the pigment binder in many leather finishing formulations. The substitution of Hycar 1571 in any given recipe tends to give a drier hand or feel to the finished leather, better penetration of the finish into the leather, and higher abrasion resistance. The wet crock resistance, or tendency of the pigment to transfer or rub off on to a wet white cotton cloth, is slightly poorer. There is also a tendency for the finish to open or crack in a sharp fold.

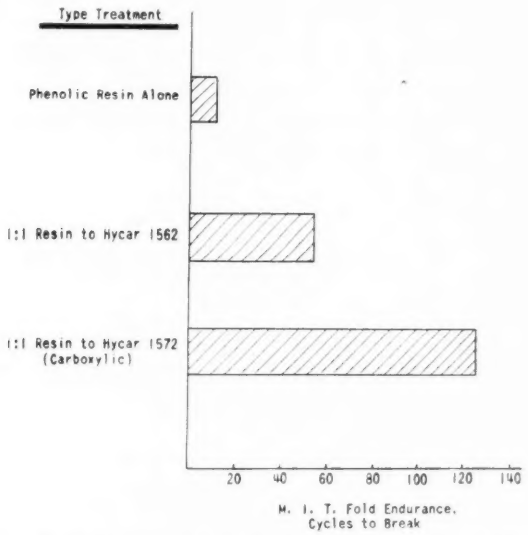


Fig. 3. Fold Endurance of Resin Treated Paper Modified with Nitrile Latices, Including Carboxylic Type

Paper Industry

The carboxylic nitriles have exhibited some rather unique and unpredicted properties when utilized in the paper industry. One of the most striking properties noticed was the penetrating power of the carboxylic latices. For high-strength specialty papers it has been the practice in the past several years to saturate absorbent paper with nitrile latex. Thick sheets of paper such as Kraft-cork-paper-board were found to give poor or spotty penetration and could not be saturated with latex by a feasible production method. Such papers had to be produced by beater addition techniques which produced paper products poorer in quality than the same product made by the saturation techniques. It was found that Hycar 1571 was particularly adapted to this penetration requirement as it gives a very rapid wetting or strike-through on these thick paper stocks. The Hycar 1571 compound gave a very uniform penetration in five seconds; while the Hycar 1561 compound showed no strike-through in 300 seconds, even when five phr. Santomerse S[6] wetting agent was added to the latex. Many uses are found for paperboards as oil resistant gaskets, seals, and packings.

Certain specialty papers are saturated with water soluble phenolic resins to give added stiffness, strength, or laminating properties. In many cases, especially in the finishing process, the paper is too brittle. Because of their excellent compatibility with phenolic resins, the nitrile rubbers were tested as modifiers for the resins. In this case, M.I.T. fold endurance was used as a criterion. This test measures the number of times a paper can be folded back 180 degrees on itself under a one-kilogram load without breaking. Using a 1:1 mixture of resin to rubber ratio the carboxylic Hycar 1572 was far superior to its normal nitrile latex counterpart, Hycar 1562. Figure 3 shows the degree of improvement in fold endurance imparted by Hycar 1572 and Hycar 1562, compared to the phenolic resin used alone. There is a fivefold improvement, when normal nitrile latex is used, over the fold endurance of the straight phenolic resin; while the carboxylic nitrile latex is more than twice as effective as the normal nitrile latex.

Another sign of increased compatibility with resins may be seen in the effect of combining the normal and carboxylic nitrile latices with a urea-formaldehyde (U.F.) wet strength resin to obtain a better balance of elongation and tensile strength in saturated paper. The nitrile rubber latices themselves impart many good properties to paper stock saturated with them, but could stand improvement in retention of tensile strength while wet. The ratio of wet tensile to dry tensile is described as % wet strength. Urea-formaldehyde resins are well known for their ability to give high wet strength, but also tend to stiffen and embrittle the paper. Modifying the nitrile latex with a suitable U.F. resin tends to give the product some of the features of both systems. It can be seen in Figure 4 that the U.F. resin improves the wet strength of papers treated with both types of nitrile latices, but the U.F. resin is several times more efficient in the carboxylic type. This improvement in wet strength is gained at no expense to dry tensile and even lends a slight improvement to the dry tensile of the carboxylic nitrile type.

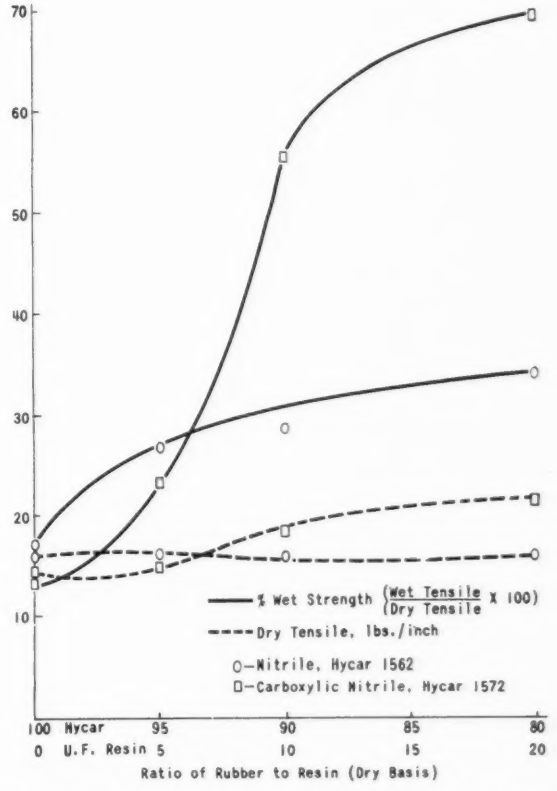


Fig. 4. Effect of Rubber-Resin Ratio on Wet Strength of Paper Saturated with a Urea-Formaldehyde Resin Modified Nitrile Latex

Textile Industry

Normal nitrile rubbers are already finding wide acceptance in the textile field as finishing agents, pigment

[6]Monsanto Chemical Co., rubber chemical sales, Akron, O.

binders, binders for non-woven fabrics, and as adhesives or tie coats. The increased reactivity and adhesive properties of the carboxylic types indicate they may be exceedingly interesting in the textile industry.

Since many garment manufacturers are interested in binders or finishes that will withstand dry-cleaning solvents, the resistance of the carboxylic-type rubbers to these solvents was studied. Perchlorethylene, trichlorethylene, and Stoddard solvent were chosen as typical dry-cleaning solvents. The volume increase or % swell is shown in Table 4. These data show that the Hycar 1571 is very similar to the Hycar 1561 in swelling characteristics and also point out the effect of cure on volume change. Curing both types of rubber with a ZnO-butyl-Zimate[7]-sulfur cure lowers the swell of both polymers by several hundred %, but the slight advantage noted for the 1571 in the uncured films is maintained in the cured films.

TABLE 4. VOLUME CHANGE OF HYCAR 1571 AND HYCAR 1561 IN DRY-CLEANING SOLVENTS

	% Volume Increase		
	Perchlorethylene	Trichlorethylene	Stoddard Solvent
Hycar 1561			
No cure	40	510 (gel)	3.6
ZnO-butyl-Zimate-sulfur	27	206	0
Hycar 1571			
No cure	27	450	0
ZnO	33	392	0
ZnO-butyl-Zimate-sulfur	16	173	1.2

The most important property of the Hycar 1571 in these solvents is not noticed in the volume change data, but is evidenced by the retention of strength of the Hycar 1571 film. Even though highly swollen, it retains its elastic characteristics and has a dry rubbery feel; while the Hycar 1561 has a rather slimy feel and is very cheesy, showing very little tensile retention. This retention of strength could be very critical in fiber binding in such applications as non-woven fabrics, curled hair padding, and general adhesives.

TABLE 5. ADHESION OF VINYL PLASTISOL COATINGS TO RAYON AND NYLON FABRICS

	Stripping Force in Lbs. per Inch	
Binder System	Rayon	Nylon
None	2	0.9
80 Pts. Hycar 1561 20 Pts. borated casein	9	5.2
80 Pts. Hycar 1571 20 Pts. borated casein	12	10.5

Plastisol Used	
Geon 121*	100
GP-261*	65
Surfex MM†	20
Dyphos‡	3
TiO_2	20

*B. F. Goodrich Chemical Co., Cleveland, O.
†Diamond Alkali Co., Cleveland, O.
‡National Lead Co., New York.

One problem that is quite important to both the textile and the plastic industries is adhesion of calendered vinyl sheets or plastisol coatings to synthetic fibers such as nylon or rayon. Here again the carboxylic latices proved superior to the normal nitrile latices. In many applications latices are preferred to cements because of their economy, ease of handling, and the safety features of a water system over a flammable solvent system.

[7]R. T. Vanderbilt Co., New York, N. Y.

Laboratory studies have shown that borated casein added to the latex gives improved adhesion characteristics to most nitrile latices, and that the best adhesion for any given latex is obtained with a blend of 80 parts nitrile rubber, 20 parts borated casein on a dry solids basis.

The advantage of the carboxylic latex in adhesive applications can be seen in Table 5. With no adhesive the adhesion of the plastisol to the fabrics is very weak. The normal nitrile latex, Hycar 1561, greatly improves this adhesion, but the carboxylic Hycar 1571 is 33% stronger than the Hycar 1561 for rayon and 100% better for nylon.

Summary and Conclusion

Carboxylic bearing monomers have been combined with butadiene and acrylonitrile to give nitrile rubbers which develop high tensile properties. This improvement is particularly apparent in the vulcanizates of pure gum stocks and latex films. Excellent cures are obtained without sulfur by the use of polyvalent metal oxides or salts to cross-link the carboxylic groups present in the polymer chain.

When compared to normal nitrile rubbers, the carboxylic nitrile rubbers also possess other additional interesting properties. These qualities combined with metal oxide vulcanization suggest many possible uses, particularly various latex applications in the paper, leather, and textile industries.

Two carboxylic nitrile latices are commercially available from the B. F. Goodrich Chemical Co. and are identified as Hycar 1571 and Hycar 1572. The dry rubbers are not available at present and are not anticipated on a commercial scale in the near future.

Acknowledgment

The authors wish to thank The B. F. Goodrich Co. and the B. F. Goodrich Chemical Co. for permission to present this paper. We also wish to express our gratitude to the many persons instrumental in obtaining much of the information and for their interpretations and advice in preparing this presentation.

Tall Oil Pitch in Reclaimed Rubber

Tall oil pitch, the undistilled residue obtained in the vacuum distillation of whole tall oil, is a low-cost material with a fairly high rosin content, and its use has been found practical in the reclaiming of rubber as a replacement for rosin normally employed.

One method for incorporating this pitch into the reclaim process is to add it to the high-temperature digesters, and the caustic soda or a metal chloride then is joined with the ground rubber and petroleum. Tall oil pitch may also be used in conjunction with coal-tar naphtha fractions to swell the rubber particles.

Another method involves the addition of the pitch to the reclaim rubber during the mixing or blending process before refining. Occasionally the pitch is united with the petroleum or coal-tar swelling oils; the mixture then is sold to the reclaimer.

Tall oil pitch has a fatty acid content of 35-50%. A solid, dark-brown material at low room temperatures, it is produced by the Arizona Chemical Co., Linden, N. J., among others, and trade marked Acintol P.

Storage Stability of GR-S Polymers[1]

By M. H. Reich,[2] T. B. Harrison,[2] *and* B. G. Labbe[2]

REGULAR GR-S polymers and experimental polymers made with other comonomers than styrene have been aged for periods as long as five years. Little change in chemical and physical properties of the regular GR-S occurred during these storage periods, although some evidence of change was indicated for LTP-type GR-S. Experimental polymers of butadiene/isoprene; butadiene/styrene/vinyl pyridine; and butadiene/styrene/divinyl benzene showed considerable increases in Mooney viscosity during storage for somewhat more than three years.

Accelerated aging at 212° F. caused large Mooney viscosity increases for GR-S-1000 and GR-I-18; whereas GR-S-1500 and polybutadiene remained constant. Stress-strain properties of GR-S-1000 and GR-I-18 were not radically affected, but GR-S-1500 lost about 50% of original tensile strength during accelerated aging.

STABILITY of the physical properties of polymers during aging is a factor of prime importance whenever it is necessary to stockpile rubber in the interest of national security, or for any other reason. The natural aging behavior of GR-S samples during storage at room temperature in the absence of light has been observed by Albert,[3] who found that a 1.0% concentration of phenyl-β-naphthylamine afforded maximum protection of the raw polymers up to five years' aging. Accelerated aging tests in which the oxygen absorption of the polymer samples was measured, using the method of Shelton and Winn,[4] correlated with the natural aging tests.[5] In this preceding study the optimum concentration of phenyl-β-naphthylamine was again determined to be 1.0%, and, in addition, polymers obtained by alum coagulation were found to have greater resistance to oxidation than those prepared by salt-acid coagulation.

In the absence of any added antioxidant, GR-S has been shown[6] to be highly unstable toward oxygen, although the presence of antioxidants in quantities as small as 0.001-part per 100 parts of polymer had a noticeable effect on the stability in the presence of oxygen, and the 1.25 to 1.5% of phenyl-β-naphthylamine ordinarily used provided adequate protection to the polymer under the usual conditions of processing or storage. This fact is substantiated by the recent report of the Defense Department which states[7] that some rubber has been in storage since 1940 and is still in "excellent condition."

The data presented in this paper show the change in physical properties which occurred in various types of polymers during natural aging periods of up to seven years' duration. Variations in the polymers tested include monomers, monomer ratios, polymerization formula, conversion, shortstop, coagulation method, and antioxidant used.

[1]The work discusesd herein was performed as a part of the research project sponsored by the Reconstruction Finance Corp., Office of Synthetic Rubber (now Federal Facilities Corp.), in connection with the Government Synthetic Rubber Program.

[2]Government Laboratories, University of Akron, Akron, O.

[3]*Ind. Eng. Chem.*, 40, 1746 (1948).
[4]*Ibid.*, 38, 71 (1946).
[5]Winn and Shelton, *Ibid.*, 40, 2081 (1948).
[6]Glazer, Parks, Cole, D'Ianni, *Ibid.*, 41, 2270 (1949).
[7]India Rubber World, 129, 82 (1953).
[8]Mooney, *Ind. Eng. Chem. (Anal. Ed.)*, 17, 514 (1945).

TABLE 1. COMPOUNDING RECIPE

Compound	A	B	C	D	E	F
	Parts					
Polymer	100	100	100	100	100	100
Channel black	—	—	—	—	50	—
EPC black	50	40	40	40	—	40
BRT #7*	5	—	—	—	—	—
Zinc oxide	5	5	5	5	5	5
Sulfur	2	2	2	2	2	2
Captax†	1.5	—	—	—	—	—
Altax†	—	1.75	3	1.75	0.5	2
Stearic acid	—	—	1.5	1.5	3	0.75
Methyl tuads†	—	—	—	—	1.0	—

*Barrett Division, Allied Chemical & Dye Corp., New York, N. Y.
†R. T. Vanderbilt Co., New York.

Experimental Procedure

The polymers were stored in open bins during the natural aging period except for three samples of GR-S Blend 45 which were sealed in metal containers to avoid change of air in contact with the polymer.

Mooney viscosity values were determined for all of the original and aged polymers. In addition, volatile matter and chemical test data were obtained for selected polymers. When the processibility was evaluated, it was measured by compounded viscosity, mill shrinkage, roughness, and extrusion through a Garvey die on a No. ½ Royle extruder. Stress-strain properties were obtained for polymers compounded according to the recipes listed in Table 1. A brief description of the tests follows:

Mill Shrinkage

After the material had been milled and remilled, the batch was allowed to run for one minute without being cut. The mill was stopped, and a sheet metal template (six by four inches), rounded to fit the curvature of the mill roll in the six-inch direction, was placed over the stock on the front roll. Care was taken to see that the knife blade was held perpendicular to the surface on the roll when cutting around the template. This strip of stock was allowed to rest on a soapstoned table for at least eight hours at room temperature. The shrinkage was determined as the percentage difference between six inches and the length of the shrunken sample.

Roughness

Roughness of the compounded stock was measured by a rugosimeter[8] which consists essentially of the following equipment in series: a constant-pressure air valve, a large needle valve with a calibrated scale, a manometer, and an annular test plate which rests upon the surface under test. By measuring the air flow resistance between the surfaces of the test specimen and the annular plate the degree of roughness of the specimen can be determined. A disk around the needle valve covers 100 units for a 360-degree turn of the valve and is graduated in increments of one unit. The valve is opened to the point where the air supply is sufficient to raise the manometer fluid to a given point in spite of the air pressure which escapes between the annular plate and the test specimen.

Thus it may be seen that a smooth stock will require less air supply than a rough stock.

Extrusion Index

The uncured compound was extruded through a Garvey die on a No. ½ Royle extruder. The extruded specimen was then compounded on the basis of swelling and porosity, surface smoothness, the corners, and the edge. Each factor is rated 1 to 4 as described by Garvey and Whitlock;[9] the higher the rating the better the quality of the extrusion.

Stress Strain

The stress-strain tests were conducted at 77° F. on stocks cured for 25, 30, 50, 60, 90, or 100 minutes at 292° F., as described in the ASTM Committee D-11 Handbook.[10]

Results and Discussion

Storage Stability of GR-S Warehoused Polymers

TABLE 2. STRESS-STRAIN TESTS AT 77° F.

(Compounding Recipe A)

		GR-S Blend 45			
			Tested July, 1948 After Storage for about 5 Yrs.		
Test	Min. Cured at 292° F.	Tested Feb., 1945 (After Aging for about 2 Yrs. in an Open Bin)	In Open Bin	In Sealed Metal Cylinders	GR-S X-418 Control—Averages of 20 Tests in June, 1948
300% Modulus, psi..	25	—	560	570	360
	30	870	—	—	—
	50	—	1200	1250	980
	60	1440	—	—	—
	90	1710	1670	1650	—
	100	—	—	—	1470
Tensile strength, psi.	25	—	1810	1640	1360
	30	2280	—	—	—
	50	—	2710	2690	3140
	60	2650	—	—	—
	90	2780	2460	2590	—
	100	2720	—	—	3190
Elongation at break, %	25	—	660	630	840
	30	600	—	—	—
	50	—	520	500	660
	60	460	—	—	—
	90	430	390	410	—
	100	—	—	—	520

[9] *Ind. Eng. Chem.*, 34, 1309 (1942).

A test of the storage stability of GR-S was started in 1943. Three batches of GR-S-1000 were blended in a Banbury mixer, and the mixture was designated as GR-S Bld 45. To insure against deterioration of the polymer with age by avoiding contact with air, some of the polymer was sealed in metal containers. Processing and stress-strain tests were performed on the unsealed material in February, 1945, and on both materials in July, 1948 (Table 2).

Examination of the stress-strain data reveals slightly, but not significantly, lower modulus values after the longer aging period. Tensile strengths were essentially similar to those obtained in 1945. Elongations at break were slightly higher in 1948 at all cures except the 90-minute cure. Comparison of the test values obtained from the polymer stored in a sealed cylinder and those from the bale exposed to air shows no material difference.

In February 1950, 14 bales of polymer, representing four separate lots which had aged for five years in a warehouse, were subjected to processing and stress-strain tests. A comparison of the original data for GR-S with those obtained later by the identical test recipe is presented in Table 3. Chemical analyses and viscosities are also shown. No definite evidence of deterioration is shown by the data presented. The chemical test results indicate little change in the polymer during five years. The viscosities remained very uniform except for the slight increase (three points) in the raw polymer AB50415. The stress-strain values indicate similar tensile strengths, somewhat higher elongations, and lower modulus values at the 25-minute cure for three of the four lots tested according to the 1950 specifications.

Another series of experiments was started in 1947, and test data were obtained on each of two lots of GR-S CC-code numbers and GR-S-AC AC-code numbers after five years of shelf-aging (see Table 4). Except for the PBNA content of AC70115-G which changed very slightly, the present chemical test values do not differ significantly from those obtained on the unaged stocks. The Mooney viscosity values indicate definite stiffening of the polymers. The 300% modulus values of all cures and the percentage elongation of the 50-minute cure of the GR-S compounds are additional proof of increased viscosity. The tensile strength of the later mixed GR-S compounds are comparable with those obtained on the original mixes.

Although the modulus data obtained on the samples

[10] ASTM Designation D412-52T, p. 201. "ASTM Standards on Rubber Products." American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. (Dec., 1952).

TABLE 3. COMPARISON OF ORIGINAL AND PRESENT DATA FOR GR-S-1000

(Compounding Recipe A)

	AB41103C1		AB50415B3		AB51120D1		DC50831G2	
Polymer No.	Orig.	1950*	Orig.	1950†	Orig.	1950	Orig.	1950
Volatile matter, %	0.20	0.14	0.40	0.29	0.14	0.13	0.22	0.18
Ash, %	1.10	1.24	0.88	1.12	1.09	1.32	0.90	1.12
ETA extract, %	8.1	—	6.8	—	6.9	—	6.9	—
Fatty acid, %‡	5.2	5.29	5.1	5.06	4.8	4.86	4.8	4.74
Soap, %§	0.1	0.1	0.04	0.05	0.03	0.03	0.06	0.08
Combined styrene, %	—	21.0	22.9	22.2	23.6	22.9	23.5	22.9
PBNA, %	—	1.55	1.43	1.32	1.42	1.45	1.47	1.42
Mooney viscosity, ML-4								
Raw	49	49	48	51	51	51	51	52
Compounded	58	59	57	64	60	61	59	63
Tensile strength (50-min. cure), psi.	2955	2990	2840	3180	3100	3300	3100	3170
Elongation (50-min. cure), %	590	590	575	650	625	670	625	660
300% Modulus, psi.								
25-min. cure	475	530	470	390	480	400	480	370
50-min. cure	1075	1060	1090	1060	1050	1020	1030	1020
90-min. cure	1500	1490	1475	1570	1460	1530	1410	1500

*Values are the average of five batches.

†Values are the average of four batches.

‡Stearic acid.

§Sodium stearate.

TABLE 4. COMPARISON OF ORIGINAL AND PRESENT DATA*

Polymer No.	CC60618-F†		CC60619-F†		AC70109-12‡		AC70115-G‡	
	Orig.	1951§	Orig.	1951§	Orig.	1951	Orig.	1951§
Volatile matter, %	0.21	0.12	0.28	0.15	0.30	0.18	0.05	0.13
Ash, %	1.14	1.10	1.16	1.31	0.50	0.55	0.59	0.49
ETA extract, %	7.45	6.19	—	6.16	—	3.62	—	4.00
Fatty acid, %	4.76	4.42	4.77	4.30	—	2.94	—	2.91
Soap, %	0.22	0.24	0.17	0.18	—	0.01	—	0.01
Combined styrene, %	23.4	23.1	23.6	23.6	23.6	23.0	23.9	22.8
Stabilizer, %	1.40	¶1.46	1.52	¶1.41	1.22	‖1.20	1.19	‖1.01
Mooney viscosity, ML-4								
Raw	49	53	50	53	50	51	49	53
Compounded	61	65	63	66	60	62	59	66
Tensile strength (50-min. cure), psi.	3140	3340	3240	3350	3005	2650	2990	2680
Elongation (50-min. cure), %	680	645	690	655	610	620	580	670
300% Modulus, psi.								
25-min. cure	420	505	400	535	385	510	380	435
50-min. cure	990	1110	1000	1105	785	1000	825	910
90-min. cure	1400	1530	1380	1530	1100	1330	1170	1280

*Original data obtained with stocks compounded using recipe A; 1951 data for salt-acid coagulated polymer compounded using recipe B and for alum-coagulated polymers using recipe D.

†Salt-acid coagulated.

§Values are the averages for two batches.

‡Alum-coagulated.

¶BLE, Naugatuck Chemical division, United States Rubber Co., Naugatuck, Conn.

‖PBNA.

TABLE 5. PROCESSING DATA—GR-S-AC AND GR-S-1000

(Compounding Recipe B)

Polymer No.	No. of Bales Tested	Viscosity, ML-4 Raw 1951	Raw 1953	Compd. 1951	Compd. 1953	Mill Shrinkage, % 1951	Mill Shrinkage, % 1953	Roughness 1951	Roughness 1953	Processing Index 1951	Processing Index 1953	Extrusion Index 1951	Extrusion Index 1953
AC70109-12	1	51	48	57	53	52	51	35	39	9.1	9.8	8.5	8.5
AC70115G1-1	2	53	52	59	56	54	52	30	36	9.3	9.9	8.5	8.5
AB50415B3-1	4	51	52	59	61	53	54	36	34	10.6	12.5	10.8	8.0
AB51120D-1	1	51	53	58	58	48	52	45	40	10.0	7.9	11.0	8.5
AB41103C1-2	4	48	49	59	57	53	54	21	29	10.7	7.8	12.6	8.8
CC60619F11	1	53	53	60	58	54	53	34	40	9.1	11.9	8.5	8.0
CC60618F9	2	53	53	60	59	52	51	53	47	9.9	13.0	8.8	7.5
DC50831G2	1	52	53	59	60	48	54	33	48	11.9	11.4	10.5	8.0

TABLE 6. STRESS-STRAIN DATA—GR-S-AC AND GR-S-1000

(Compounding Recipe B)

Cured at 292° F.		300% Modulus Psi. 50		Tensile Strength Psi. 50		Elongation % 50		Optimum Cure (Min.) t_p	
Specification Limits—Min.		850		2700		550			
Max.		1200							
Test Data	No. of Bales Tested	1951	1953	1951	1953	1951	1953	1951	1953
AC70109-12	1	1130	1020	2720	2780	570	600	42	45
AC70115G1-1	2	1030	940	2760	2740	610	620	45	45
AB50415B3	4	1030	1060	2990	2920	610	600	50	50
AB51120D		1060	1050	2950	2890	590	570	49	51
AB41103C1	4	1060	1040	2820	2730	590	570	46	51
CC60619F11	1	1100	990	3300	3050	630	640	46	48
CC60618F9	2	1160	940	3450	2920	640	630	46	50
DC50831G2	1	1000	1080	2970	2700	610	560	49	49

TABLE 7. SUMMARIZED PHYSICAL TEST RESULTS FOR COMPOUNDS OF AGED LOW-TEMPERATURE GR-S POLYMERS*

Time of Test	Oct., 1950			Apr., 1951			Dec., 1952		
Min. cured at 292° F.	30	60	90	30	60	90	30	60	90
				Polymer X-558					
300% Modulus, psi.	490	920	1290	560	1050	1340	580	1060	1400
Tensile strength, psi.	3550	4400	4330	3980	4460	4480	3660	4550	4280
Elongation, %	880	700	610	870	700	620	880	690	580
t_p, min.		51.5			49.3			51.6	
				Polymer X-568					
300% Modulus, psi.	560	1150	1500	670	1220	1610	670	1290	1680
Tensile strength, psi.	3350	4140	3940	3350	4210	4040	3300	4220	4100
Elongation, %	820	650	550	790	640	530	770	600	520
t_p, min.		50.4			45.1			45.9	
				Polymer X-592					
300% Modulus, psi.	750	1190	1460	870	1300	1550	870	1360	1650
Tensile strength, psi.	4150	4620	4270	4390	4550	4010	4100	4720	4390
Elongation, %	750	650	570	750	630	520	740	630	540
t_p, min.		40.3			28.1			34.8	

*Compounding recipes used were as follows: X-558 and -592, recipe C; X-568, recipe F.

TABLE 8. MOONEY VISCOSITY DATA—XP POLYMERS

XP No.	Monomer	Shortstop (Part and Type)	Anti-oxidant	Activator Type	Activator Part	Original Viscosity Date	Original Viscosity ML-4	First Test Storage Months	First Test ML-4	Total Storage Months	ML-4 Change	ML-4 after Add'l Storage Months 6	12	18	24	36
59	71/29	0.1														
	BD/S	HQ(*a*)	PBNA	$K_2S_2O_8$	0.23	1-24-47	13	4	20	28	+7	19	—	22	20	—
6	72/28	0.10														
	BD/S	HQ	Stalite	$K_2S_2O_8$	0.30	4-1-45	50	26	57	62	+15	61	64	59	60	63
61	72/28	0.15														
	BD/S	NaHS(*b*)	IBUL(*c*)	$K_2S_2O_8$	0.23	1-29-47	100	4	96	40	−6	100	98	92	91	94
*	71/29															
	BD/S	NaHS(*b*)	UBUF(*d*)	$K_2S_2O_8$	0.23	—	22	3	25	27	+3	24	24	25	—	—
†	60/40	0.1														
	BD/S	HQ	PBNA	$K_2S_2O_8$	0.23	—	29	3	31	33	+1	33	33	31	30	—
50	65/35	0.1														
	BD/S	HQ	PBNA	$K_2S_2O_8$	0.23	3-21-47	37	2	37	38	−2	37	37	40	36	35
60B	0.5	0.15														
	**DVB	NaHS	UBUF	$K_2S_2O_8$	0.23	2-28-47	60	3	69	39	+48	79	95	94	89	108
	72/27.5															
	BD/S															
63	PolyBD	0.10														
	HQ	PBNA	$K_2S_2O_8$	0.23	2-10-47	51	4	53	16	+2	55	53	—	—	—
‡45	72/28	0.20														
	††BD/AMS	HQ	PBNA	Redsol	0.15	12-17-46	58	6	61	29	0	60	59	60	58	—
				$K_2S_2O_8$	0.60											
§36	71/29															
	††BD/MCS	HQ	PBNA	$K_2S_2O_8$	0.23	—	63	4	66	40	−4	67	66	65	63	59
¶	71/29	0.20														
	§§BD/DCS	HQ	PBNA	$K_2S_2O_8$	0.23	—	67	4	68	40	+2	73	70	71	67	69
21	63/37	0.20														
	BD/DCS	HQ	PBNA	$K_2S_2O_8$	0.25	8-31-45	75	21	77	57	−9	77	74	77	71	66
3	75/25	0.10														
	••BD/VP	HQ	BLE	$K_2S_2O_8$	0.30	3-16-45	63	26	64	62	−4	64	62	60	61	59
5	72/18/10	0.10														
	BD/S/VP	HQ	PBNA	$K_2S_2O_8$	0.30	4-1-45	50	26	46	62	+16	54	—	57	56	66
				Redsol	0.15											
‖	75/25	0.30														
	‖‖BD/I	HQ	BLE	$K_3Fe(CN)_3$	0.20	—	76	24	83	60	−15	76	74	69	71	61
				$K_2S_2O_8$	0.30											

*Average of 5 values (XP-62 and -76).
†Average of 2 values (XP-49 and -52).
‡Average of 2 values for XP-45.
§Average of 2 values for XP-36.
¶Average of 6 values (XP-39 and -42).
‖Average of 4 values (XP-4 and -7).
**Divinyl benzene.
††Methyl styrene.
‡‡Monochlorostyrene.
§§Dichlorostyrene.
••Vinyl pyridine.
‖‖Isoprene.
(*a*) Hydroquinone.
(*b*) Sodium hydrosulfide.
(*c*) Dicresol disulfide.
(*d*) Disodium dicresol disulfide.

of GR-S-AC stored in the warehouse verified the tendency toward stiffening shown by the viscosities, the percentage elongation of the 50-minute vulcanizates is equal to or higher than that obtained five years earlier. The tensile strengths of the later vulcanizates of the GR-S-AC compounds are 10 to 12% lower than the original values.

The effect of an additional 2 to 2½ years shelf-aging of 12 samples of GR-S-1000 and 4 of GR-S-AC, produced between 1944 and 1947, upon their processing and stress-strain properties was determined. Data are shown in Tables 5 and 6.

The alum-coagulated polymers (AC-code numbers) show a tendency to soften (lower viscosity) with aging, but no significant differences may be noted among the other processing properties. Thirteen of the 16, GR-S-1000 samples in the raw state increased in Mooney viscosity from 1-4 ML-4 units, but no definite trends are shown by the processing indices. Extrusion data indicate poorer tubing properties than were obtained by previous tests.

A comparison of the stress-strain results reveals the 300% modulus values of the alum-coagulated polymer stocks to be definitely lower than previously determined, although the tensile strength, elongation, and optimum cure values are similar to earlier results.

The modulus values of the GR-S-1000 vulcanizates are in good agreement with the values obtained previously, except for two of the 25-minute cures. All modulus values are within the specification limits set by the Office of Synthetic Rubber, but four of the batches produced tensile strength values which were below the specification requirement of 2700 psi. There appears to be a slight trend to slower curing with aging of the polymers, as judged by the t_0 values.[11]

Low-temperature polymers GR-S X-558, X-568, and -592 were aged about two years, and the test data are in Table 7. A description of the polymers follows:

GR-S Polymer	X-558	X-568	X-592
BD/S	71/29	71/29	71.5/28.5
Temp. of polymerization, °F.	41	41	41
Sugar content	Low sugar	Sugar free	Sugar free
Oxidizing agent	CHP*	DIBP§	CHP
Emulsifier	Dres. 214†	Dres. 214/ KFA soap¶	Dres. 731
Activator	Iron-pyro.	TEPA‖	Silicate-iron
Shortstop	DNCB‡	Sodium Captax	ADAM††
Stabilizer	BLE	Wing-Stay S**	BLE

††Sodium dimethyl dithiocarbamate.
*Cumene hydroperoxide. Hercules Powder Co., Wilmington, Del.
†Potassium soap of disproportionated rosin. Hercules Powder.
‡Dinitrochloro benzene.
§Di-isopropyl benzene monoperoxide.
¶Potassium fatty acid soap.
‖Tetra ethylene pentamine.
**Chemical division, Goodyear Tire & Rubber Co., Akron.

The Mooney viscosities of both the raw polymers and

[11]Schade, India RUBBER WORLD, Apr., 1952, p. 67.

the compounded stocks of all three polymers increased during the storage period. The 300% modulus values of all three polymers increased after six months in storage; while all other stress-strain and strain properties remained essentially unchanged. From April, 1951, to December, 1952, the stress-strain and strain values remained essentially unchanged. Each value represents the average of two tests.

XP Polymers

The Mooney viscosities of a group of 21 XP polymers were determined every six months for a period of about two years; results are shown in Table 8.

Five polymers (XP-59, -6, -61, -62, and -76) prepared with approximately a 71/29 BD/S monomer ratio, but with four different stabilizers, showed little change in viscosity (±7 ML-4) during 27 to 40 months' storage, except for XP-6, which increased 15 ML-4 during 40 months' storage.

The Mooney viscosities of XP-49 and -52 (60/40 BD/S) and XP-50 (65/35 BD/S) remained relatively constant during a 33- to 38-month storage period.

Of the polymers tested, XP-60B (72/27.5/0.5 BD/S/DVB) exhibited the greatest increase in Mooney viscosity changing from 60 to 108 ML-4 during 39 months' storage.

Polybutadiene XP-63, after 16 months' storage, had increased in viscosity only 2 ML-4.

XP-45 (72/28 BD/AMS) was one of the most stable polymers tested. Viscosity changes of 0 to +3 ML-4 units were noted over a period of 29 months of aging.

Two lots of a butadiene/monochlorostyrene polymer (XP-36) showed an average viscosity decrease of 4 ML-4 units at the end of an aging period of 40 months.

Copolymers of 71/29 butadiene/dichlorostyrene (average of six lots of XP-39 and -42) exhibited an increase of only 2 ML-4 during 40 months storage; while XP-21 (63/37 BD/DCS) decreased 9 ML-4 units during 57 months' aging.

A 75/25 butadiene/vinylpyridine copolymer (XP-3) decreased only 4 ML-4 units during 62 months of aging.

XP-58 a 72/28/10 butadiene/styrene/vinylpyridine tripolymer increased by 16 ML-4 during aging for more than five years.

The butadiene/isoprene polymers (XP-4 and -7) showed an average viscosity change of —15 ML-4 units during a five-year period.

Another group of 15 XP-polymers was tested after storage periods of from 46 to 60 months. Data were also obtained for GR-S polymers prepared at 122 and 41° F. in the plant and for a sample of Russian rubber for comparative purposes (see Table 9).

The comparative polymers showed little change in viscosity (from —2 to +8 ML-4 units) during storage for from 52 to 90 months, except for X-478 which increased 12 ML-4. The nine XP polymers prepared with about 71/29 BD/S monomer ratio (but by polymerization formulae other than the Mutual, incremental modifier addition, at several temperatures, or to various conversions) increased in viscosity from 10 to 19 ML-4 units.

Polymers with charge ratios of 85/15, 90/10, and 95/5 butadiene/styrene (XP-138, -140, and -143, respectively) prepared at 122° F. changed only +2 to +6 ML-4 during storage.

Polybutadiene (XP-148) was also relatively stable, increasing only 4 ML-4 units during a storage period of 58 months.

TABLE 9. MOONEY VISCOSITY DATA—XP POLYMERS AND RUSSIAN RUBBER

XP No.	Monomer	Temperature, °F.	Variation	Original Viscosity		Tested		Total Storage Months	ML-4 Change
				Date	ML-4	6/52 ML-4	12/52 ML-4		
GR-S	—	122	Control	6/45	51	57	56	90	+5
Russian Rubber	—	—	—	7/46	32	33	34	77	+2
GR-S-10	—	122	Control	10/47	57	55	55	62	−2
X-478	71/29 BD/S	41	Control	8/48	59	68	71	52	+12
X-485	71/29 BD/S	41	Control	8/48	51	58	59	52	+8
104	71.5/28.5 BD/S	122	40% Conv.	12/47	93	70	†57	60	—
105	71.5/28.5 BD/S	122	60% Conv.	12/47	96	109	111	60	+15
106	71.5/28.5 BD/S	122	80% Conv.	12/47	100	110	115	58	+15
166	71.5/28.5 BD/S	122	Incremental Modification	8/48	43	62	62	52	+19
136	71.5/28.5 BD/S	41	CHP-redox	3/48	64	73	74	54	+10
180	71.5/28.5 BD/S	41	CHP-redox Sugar-free	4/49	53	60	64	44	+11
135	72/28 BD/S	41	Benzoyl peroxide-redox	2/48	52	66	63	57	+11
137	72/28 BD/S	14	CHP-redox	6/48	58	67	71	56	+13
138	85/15 BD/S	122	Monomer ratio	4/48	42	46	48	56	+6
140	90/10 BD/S	122	Monomer ratio	4/48	43	43	45	56	+2
143	95/5 BD/S	122	Monomer ratio	4/48	34	37	39	56	+5
148	100/0 BD/S	122	Monomer ratio	2/48	29	33	33	58	+4
153	50/50 BD/I	122	Monomer ratio	4/48	58	57	59	56	+2
151	0/100 BD/I	131	Monomer ratio	4/48	48	17	20	56	−28

*The polymers were shortstopped with hydroquinone and stabilized with phenol-β-naphthylamine except where noted otherwise.
†The polymer crumbled in the viscometer during testing, indicating a higher ML-4 value than the one listed.
‡The polymer was shortstopped with a mixture of hydroquinone and ditertiary butyl hydroquinone.

TABLE 10. STRESS-STRAIN DATA (TESTS AT 77° F.) FOR TREATED AND UNTREATED POLYMERS

		GR-I-18			GR-I-18A*		
		Vulcanizate Aged at 212° F.			Vulcanizate Aged at 212° F.		
	Min. Cured at 307° F.	Unaged	24 Hrs.	48 Hrs.	Unaged	24 Hrs.	48 Hrs.
300% Modulus, psi.	20	590	900	1010	570	900	960
	40	810	1030	1080	810	1040	1070
	80	1030	1170	1190	1030	1160	1180
Tensile strength, psi.	20	3020	2760	2740	2630	2590	2580
	40	2900	2810	2770	2710	2610	2620
	80	2800	2610	2710	2600	2400	2540
Elongation at break, %	20	820	680	630	810	690	640
	40	700	630	600	720	650	630
	80	610	560	580	610	560	570
	Min. Cured at 292° F.		X-603			X-603A	
300% Modulus, psi.	50	1330	2410	1850	1120	1360	—
	100	1880	—	1830	1620	1410	1790
Tensile strength, psi.	50	3090	2650	2010	2410	2060	1610
	100	2670	2200	2030	2570	2450	1910
Elongation at break, %	50	540	330	200	520	260	170
	100	380	260	220	410	290	210
			X-624			X-624A	
300% Modulus, psi.	50	840	2230	1800	970	2270	1780
	100	1460	2510	1740	1560	2530	1970
Tensile strength, psi.	50	3630	2920	2260	3710	2940	2110
	100	4020	2750	2060	3630	2910	2190
Elongation at break, %	50	720	370	240	690	360	230
	100	570	320	220	520	330	210
			X-632			X-632A	
300% Modulus, psi.	50	870	1880	1310	1240	1350	—
	100	1380	—	1390	—	—	—
Tensile strength, psi.	50	2670	1980	1530	1370	1540	1340
	100	2450	1810	1580	1320	1390	1500
Elongation at break, %	25	740	380	290	330	230	190
	50	590	300	220	330	210	160
	100	420	270	210	250	190	180
			XP-155			XP-155A	
300% Modulus, psi.	50	620	880	—	610	890	—
	100	860	800	1110	840	830	1090
Tensile strength, psi.	50	1010	1470	980	1010	1410	890
	100	1360	1280	1150	1400	1320	1280
Elongation at break, %	50	450	290	150	440	270	150
	100	430	280	210	440	280	220

*A designates raw polymer that had been pretreated for 48 hours at 212° F.

Excellent stability was shown by XP-153 (50/50 butadiene/isoprene) which increased 2 ML-4; whereas polyisoprene (XP-151) decreased 28 ML-4 during the same 56-month storage period.

Raw polymers GR-I-18, GR-S-1000 (X-603), GR-S-1500 (X-624 and X-632), and polybutadiene (XP-155) were aged for 48 hours at 212° F. The effect of aging the polymers upon the Mooney viscosity was as follows:

	Mooney Viscosity*	
	Before Aging	After Aging
GR-I-18	71	44
X-603	52	29
X-624	48	48
X-632	41	88
XP-155	26	27

*ML-8 value for GR-I-18; ML-4 value for the others.

The stress-strain data for unaged and aged vulcanizates of both the untreated and the treated polymers are shown in Table 10. The regular mixes are coded with the polymer numbers; whereas the batches with the pretreated raw polymers are coded with the suffix A. Compounding recipe E was used for GR-I-18, recipe B for X-603, and recipe C for the other three polymers.

The relative changes in stress-strain properties caused by heating the raw polymers are shown in Table 11.

TABLE 11. PERCENTAGE RELATIONSHIP OF STRESS-STRAIN VALUES FOR COMPOUNDS OF PREHEATED POLYMER TO THOSE FOR NORMAL POLYMER COMPOUNDS

	Min. Cured at 292° F.	GR-I-18*	X-603	X-624	X-632	XP-155
300% Modulus	25	97	73	110	186	103
	50	100	84	116	143	98
	100	100	86	107	—	98
Tensile strength	25	87	71	97	48	130
	50	93	78	102	51	100
	100	93	96	90	54	103
Elongation	25	99	105	95	45	116
	50	103	96	96	56	98
	100	100	108	91	60	102

*Cures of GR-I-18 were 20, 40, and 80 minutes at 307° F.

The data represent the percentage relationship of the values obtained for vulcanizates of the preheated polymers to those obtained for the vulcanizates of untreated polymer. Practically no change occurred in the modulus of Butyl and polybutadiene stocks. The modulus values of the standard GR-S compounds decreased in values; while those of X-624 and X-632 increased. The tensile strengths of Butyl, X-624, and XP-155 vulcanizates average within 15% of the original values; whereas the tensile strengths of X-603 fell off about 20%, and those of X-632 fell off approximately 50%. The effect of aging

(Continued on page 800)

Laboratory Methods of Dynamic Testing of Compounds Containing Reclaimed Rubber

By J. M. Ball[2] *and* R. L. Randall[2]

HYSTERESIS values on laboratory prepared compounds of natural and GR-S synthetic rubbers and mixtures of each with whole tire reclaim show that in addition to the lower values for natural rubber, as compared with GR-S, in some cases even with 25% reclaimed rubber the natural rubber mixture still is lower than 100% GR-S. Tests with two of the methods show that natural rubber with 50% reclaimed rubber has lower hysteresis values than 100% GR-S.

Dunlop pendulum and torsional hysteresis tests give essentially equivalent results. The absolute hysterometer magnifies, and the St. Joe Flexometer minimizes the differences between natural rubber and GR-S in reclaimed rubber compounds. Tests with the inclined plane tester show no significant differences between the two series of compounds.

RECLAIMED rubber is a commercial favorite because satisfactory products containing it can be made with a resulting saving to the consumers of the products. In their endless search for better and cheaper products the rubber goods manufacturers need many tools; therefore a discussion of new tools and methods of using or interpreting data from the old ones is always in order. Dynamic testing is a tool often used in building rubber products, and the scientist must relate such testing to the service requirements of the product, or he may overlook advantages to be gained by the use of reclaimed rubber and other materials. Published data on the dynamic properties of compounds containing reclaimed rubber are meager.

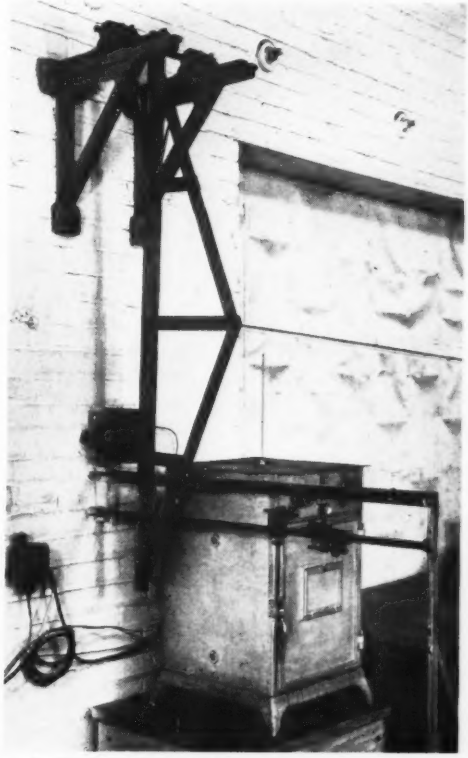
The present work describes the dynamic properties of mixtures of reclaimed and natural rubber, and of mixtures of reclaim and GR-S. The compounds in Table 1 are test recipes only, designed to have approximately equal hardness, specific gravity, and RHC by volume. Five different test methods are used: (1) Dunlop pendulum; (2) torsional hysteresis; (3) absolute hysteresis; (4) St. Joe flexometer; (5) inclined plane hysteresis.

[1] Presented before the Division of Rubber Chemistry, A. C. S., Louisville, Ky., Apr. 14, 1954.
[2] Midwest Rubber Reclaiming Co., East St. Louis, Ill.
[3] "The Mechanical Structure of Rubber." A. Healey, *India Rubber J.*, 69, 57 (1925).
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"The Dunlop Pendulum Machine." *The Vanderbilt News*, 10, 2, 26 (1940).
"Errors Arising in the Pendulum Test for Resilience of Rubber." D. Bulgin, *Trans. Inst. Rubber Ind.*, 20, 1, 24 (1944).

Dunlop Pendulum Data

The Dunlop pendulum test was originated by the Dunlop company.[3] See Figure 1. The data were kindly obtained for the authors by George C. Miller, Dunlop Tire & Rubber Corp., Buffalo, N. Y.

The test specimen is a solid block two- by two- by one-inch, cured at 274° F. Minimum hysteresis or power loss occurs at a curing time somewhat beyond that of maximum tensile. Samples are conditioned and maintained at a temperature of 50° C. For each cure, pendulum rebound readings from several heights of drop are taken. The indentations of the sample by the pendulum ball are also measured. From these data the power loss corresponding to a predetermined standard force value is calculated. The data are given in Table 2.



Dunlop Tire & Rubber Corp.

Fig. 1. The Dunlop Pendulum Machine

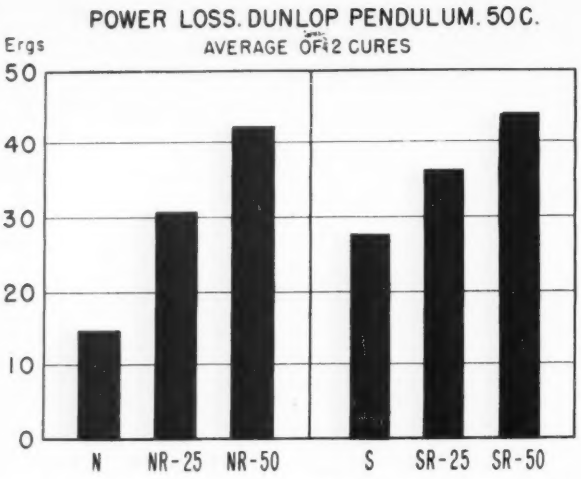


Fig. 2. Power Loss Data from Tests with Dunlop Pendulum; Note That NR-25 Value Is Nearly as Low as 100% GR-S

TABLE 1. THE COMPOUNDS USED

	N	NR-25	NR-50	S	SR-25	SR-50
Smoked sheet	100	75	50	—	—	—
GR-S 1500	—	—	—	100	75	50
Reclaim, whole tire	—	50	100	—	50	100
MT black	110	87.5	65	110	87.5	65
Process oil	10	7.5	5	10	7.5	5
Stearic acid	2	2	2	2	2	2
Zinc oxide	5	5	5	5	5	5
Antioxidant*	1	1	1	1	1	1
Thiazole†	1	1	1	1	1	1
DPG	0.25	0.25	0.25	0.25	0.25	0.25
Sulfur	3	3	3	3	3	3
	232.25	232.25	232.25	232.25	232.25	232.25
Specific gravity	1.25	1.25	1.25	1.27	1.27	1.26
Press cure at 287° F.	15'	15'	20'	30'	25'	25'
300% Modulus, psi.	1605	1255	1170	1305	1125	975
Tensile strength, psi.	2125	1875	1570	1590	1310	1265
% Elongation	445	445	405	430	430	445
Shore hardness	63	62	62	63	63	63

*Santoflex BX, Monsanto Chemical Co., rubber chemicals department, Akron, O.
†Benzothiazyl disulfide.

Note: N = Natural rubber.
NR-25 = Natural rubber, 75
Reclaimed rubber, 25
NR-50 = Natural rubber, 50
Reclaimed rubber, 50
S = GR-S
SR-25 = GR-S, 75
Reclaimed rubber, 25
SR-50 = GR-S, 50
Reclaimed rubber, 50

TABLE 2. DUNLOP PENDULUM DATA

Compound	Cure at 274°F., Min.	Shore Hardness	% Resilience	Identation, Mm.	Power Loss, Ergs
N	40	60	79.3	8.55	14.5
	50	61	79.0	8.70	14.9
NR-25	40	62	60.8	8.52	30.5
	50	62	62.1	8.51	30.2
NR-50	50	62	53.6	9.06	42.5
	60	62	52.6	8.79	42.2
S	70	59	61.8	8.13	28.3
	80	59	64.2	8.01	26.4
SR-25	70	57	54.1	8.40	37.3
	80	58	54.9	8.08	35.1
SR-50	70	59	50.3	8.54	43.0
	80	59	49.8	8.71	44.8

Figure 2, which is a plot of the power loss data in Table 2, shows that natural rubber alone gives lower power loss than GR-S, and that a 25% replacement of the natural rubber with whole tire reclaim on an equal RHC basis gives a value nearly as low as that of the straight GR-S compound without any reclaim. With the high proportion of reclaim there is no difference between natural rubber and GR-S. The values for the intermediate compounds in each series lie approximately halfway between the values for the other two compounds.

Torsional Hysteresis Data

This test was originated by M. Mooney and R. H. Gerke.[4] (See Figure 3.) The data were kindly obtained under the direction of Dr. Mooney.

A T-50 test specimen is died out from a press-cured slab, and completely supports a torsional pendulum placed inside an oven maintained at 50° C. The sample is preworked by stretching before being tested. The pendulum is turned several times through approximately 360 degrees and allowed to oscillate; then the deflections at the end of several oscillations are recorded.

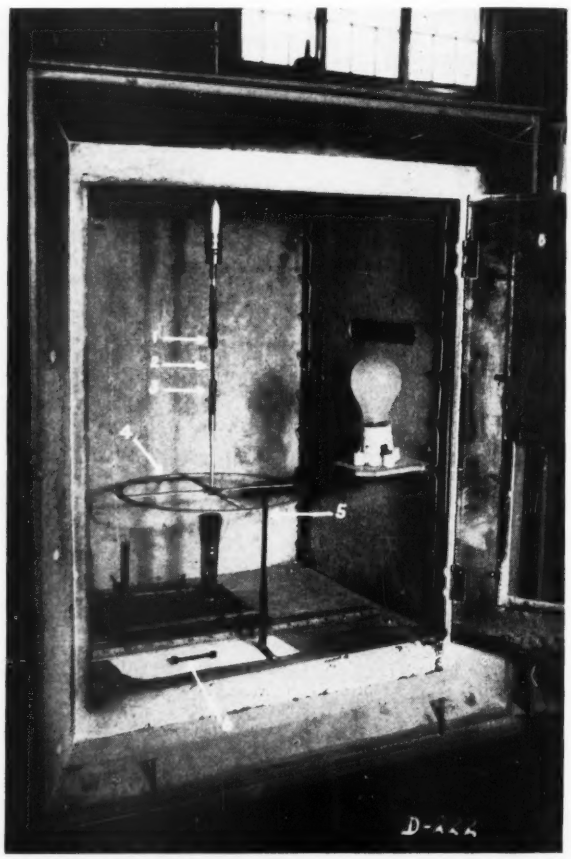
The logarithmic decrement, K, is calculated from an equation relating the amplitudes of the initial and final cycles. The logarithmic decrement, K, is calculated from the equation:

$$\frac{A_n}{A_0} = 10^{-nK}$$

in which

A_0 = amplitude of the zero, or initial oscillation

[4] "A Torsional Hysteresis Test for Rubber." *Rubber Chem. Tech.*, 14, 35 (1941).



United States Rubber Co.

Fig. 3. U. S. Rubber Co. Torsional Hysteresis Apparatus Showing Specimen Clamps (1, 3), Test Specimen (2), Graduated Circular Pendulum (4), Stationary Marker (5), and Second Dumbbell Specimen (6)

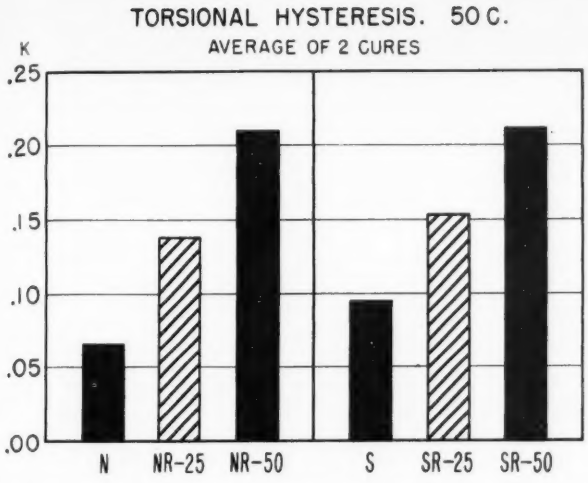


Fig. 4. Data on Torsional Hysteresis; NR-25 and SR-25 Values Estimated

A_n = amplitude of the nth oscillation
K = logarithmic decrement (to the base 10).

Here are the data on four of the six compounds:

TABLE 3. DATA FROM TORSIONAL HYSTERESIS TEST

Compound	Cure at 287° F., Mfn.	K
N	15	0.076
	22.5	0.055
NR-50	20	0.207
	40	0.214
S	30	0.112
	45	0.079
SR-50	25	0.219
	37.5	0.204

Figure 4 shows the bars for the two intermediate compounds with shaded lines assuming that they would lie halfway between the two sets of bars covered by the data. This assumption seems justified by the Dunlop pendulum data. The results are broadly similar to those obtained on power loss.

Absolute Hysteresis Data

This test was originated by M. Mooney,[5] who has kindly supervised the tests and has submitted the following information:

"Since our absolute hysterometer has never been described in published literature, the details concerning this test are given here. The sample consists of a rubber ring die-cut from a sheet approximately $\frac{1}{10}$-inch thick. The inner and outer diameters of the ring are respectively, 0.50- and 0.75-inch. During the test the sample is compressed between parallel plates to .80x its initial height. The upper plate is driven in oscillatory rotation about an axis through the center of the sample; the amplitude of the rotation is such as to produce a mean torsional shear in the sample of 43%. The frequency of the oscillation is the natural frequency of the system, determined by the modulus of rigidity of the sample, its dimensions, and the moment of inertia of the system.

"The electrical energy required to maintain the oscillation at constant amplitude is readily calculated from instrument readings. The hysteresis constant H_n calculated from the test is the energy loss per unit volume per cycle at unit shear amplitude. The computation assumes that the energy loss is proportioned to the square of the amplitude, an empirical law which is found to hold very closely. The modulus of rigidity is calculated, of course, from the moment of inertia, the frequency and sample dimensions."

TABLE 4. ABSOLUTE HYSTERESIS VALUES BY U. S. RUBBER CO. METHOD

Tests made at 50° C.

Compound	Cure at 287° F., Min.	Frequency Cycles/Sec.	Hysteresis $10^6 \times H_n$ Ergs/Cm³	Shear Modulus[5] $10^6 \times M$ Dynes/Cm²
N	15	6.61	3.03	11.2
	22.5	6.67	3.02	11.7
NR-50	20	6.30	5.92	10.1
	30	6.25	6.07	10.6
S	30	6.35	5.92	10.9
	45	6.84	5.43	12.3
SR-50	25	6.27	7.67	10.7
	37.5	6.55	7.90	11.3

Figure 5 shows the apparatus used.

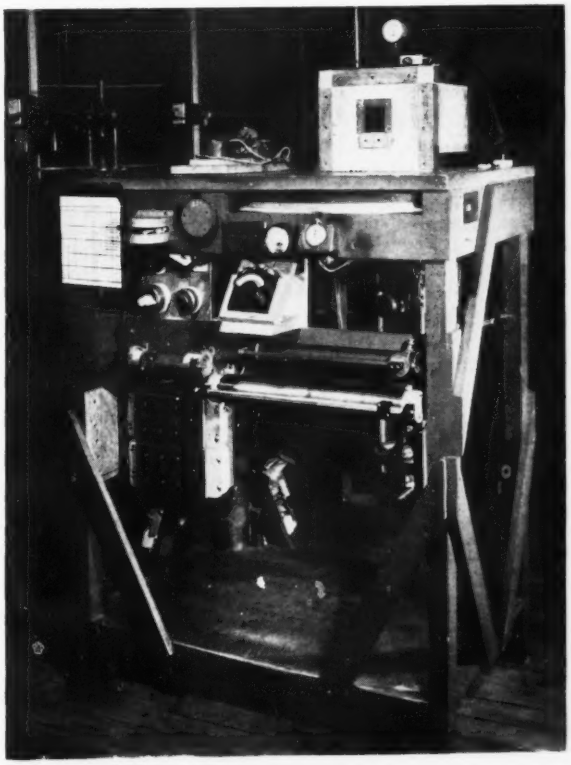
Figure 6 shows that, under the more rapid deformation of this test there is a greater difference between natural rubber and GR-S in the reclaim compounds than in the two previous tests. Also the natural rubber compound containing reclaim in 25% substitution actually has a lower hysteresis than the GR-S control without reclaim.

St. Joe Flexometer Data

This test was originated by R. S. Havenhill and W. B. MacBride,[6] and the St. Joe flexometer is shown in Figure 7. The data were kindly obtained under the direction of Dr. Mooney.

A test specimen 1.5-inches diameter by $\frac{5}{8}$-inch in height is rotated between two parallel plates; the base is off-center in relation to the top. The vertical load

[5] General Laboratories, United States Rubber Co., Passaic, N. J.
[6] "A New Laboratory Machine for Evaluating Breakdown Characteristics of Rubber Compounds." *Ind. Eng. Chem. (Anal. Ed.)*, 7, 60 (1935).



United States Rubber Co.

Fig. 5. U. S. Rubber Co. Absolute Hysterometer

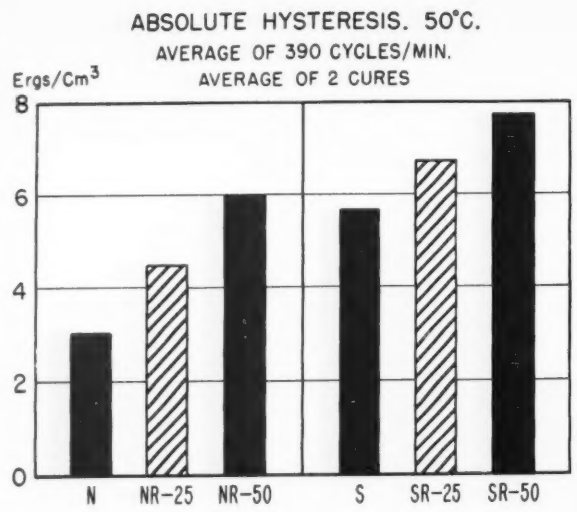


Fig. 6. Absolute Hysteresis Data; Shaded Bars, Estimated Values

was 392 pounds; the horizontal deflection of the lower plate with respect to the upper, 0.25-inch; and the speed of rotation was 700 rpm.

Readings of the height of the sample under the constant vertical load were made every five minutes. In the table of results:

H1 = initial height of sample under constant vertical load.
H2 = height of sample at last reading before blowout.
L1 = initial horizontal load to produce constant horizontal deflection.
L2 = final horizontal load at blowout time.
t = blowout time.
T = blowout temperature.

The data shown are averages of duplicate determinations except for Compound N, where only one specimen for each cure was tested.

TABLE 5. DATA OBTAINED WITH ST. JOE FLEXOMETER

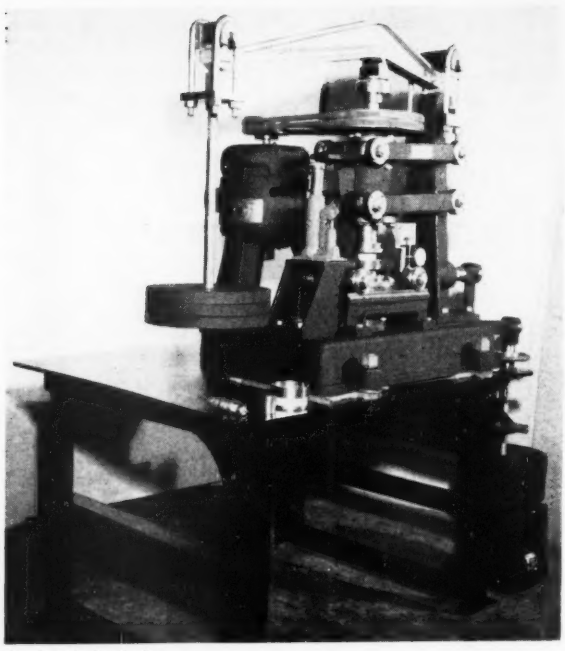
Compound	Cure at 287° F., Min.	H1, In.	H2, In.	L1, Lbs.	L2, Lbs.	t, Min.	T, °F.
N	25	0.455	0.390	87	85	14.5	188
	32.5	0.465	0.378	90	85	18.8	188
NR-50	30	0.449	0.355	69	70	9.0	202
	40	0.448	0.313	72	73	10.3	204
S	40	0.450	0.375	92	135	14.0	245
	55	0.493	0.389	98	128	18.0	233
SR-50	35	0.445	0.332	78	83	5.5	195
	47.5	0.437	0.344	79	78	5.8	190

In the interpretation of these data the following comments supplied by R. S. Havenhill may be helpful:

"1. The longer the blowout time the better the stock as it will better withstand not only the actual flexing, but also the heat developed by the flexing.

"2. The blowout temperature is, in general, a measure of the heat developed, but a more significant method is to measure the temperature with a needle thermocouple at the end of some intermediate time such as about one-half the blowout time.

"3. The difference between the initial and final height of the specimen is a measure of the distortion and set produced by the flexing and also by the heat developed by flexing. In general, the smaller this difference the better the stock, although this calculation is often ignored.



St. Joseph Lead Co.

Fig. 7. St. Joe Flexometer

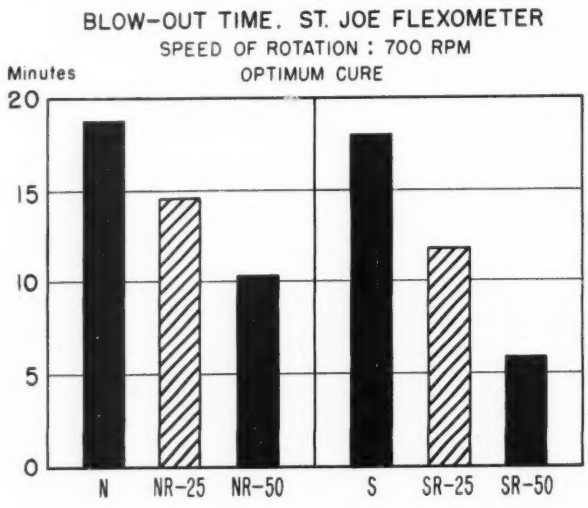


Fig. 8. Data for Blowout Times Obtained with St. Joe Flexometer

"4. The horizontal load is an indication of the amount of work being done on the specimen. Inasmuch as the flexing is being done at a constant elongation, the greater the horizontal flexing load the more work being done on the sample during test. Some laboratories, however, ignore this consideration in their evaluations."

Now, having in mind all these comments, what should be the conclusions?

Figure 8 shows the results on blowout time. The natural rubber compounds have higher values in all cases than their GR-S counterparts, and this difference is greater the higher the proportion of reclaim.

If an attempt were made to rate the four compounds on a percentage basis for each of the four determinations, we would arrive at the data in Table 6, using the values for the longer of the two cures in all cases.

This is the only one of the five tests used where the test was continued to destruction of the specimen.



Scott Testers, Inc.

Fig. 9. Inclined Plane Tester of Scott Testers, Inc.

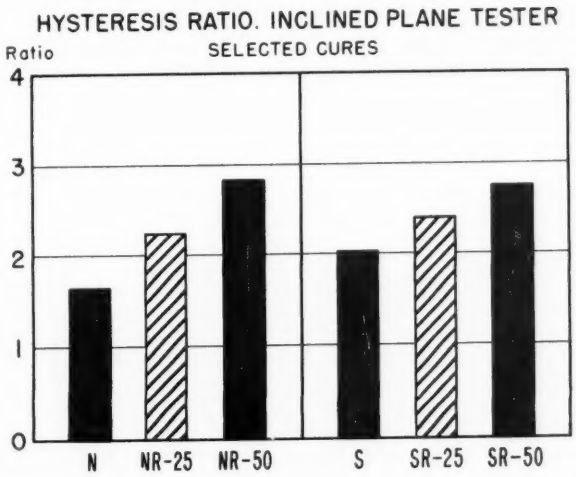


Fig. 10. Hysteresis Ratio Data Obtained with Inclined Plane Tester

TABLE 6. COMPOUND RATINGS IN % BASED ON ST. JOE FLEXOMETER

Compound	t	T	H1-H2	L2	Avg.	Final Rating
N	100	100	100	67	92	100
NR-50	55	92	64	57	67	73
S	96	81	84	100	90	98
SR-50	31	99	94	61	71	77

Inclined Plane Hysteresis Data

This test was originated by W. B. Dunlap, Jr., C. J. Glaser, Jr., and A. H. Nellen,[7] who kindly obtained the data. The inclined plane tester itself was developed by Scott Testers, Inc., Providence, R. I., and is made by that firm. Figure 9 shows this apparatus.

A T-50 test specimen is elongated to approximately 200%, and then allowed to retract. The initial load at 50% elongation, designated 1-50, and the load on recovery to 50% elongation, designated R-50, are determined. An arbitrary hysteresis ratio, I-50/R-50, is then calculated. The set is also recorded, taken as the elongation in % at which the retraction curve intersects the base of the graph.

TABLE 7. INCLINED PLANE TEST DATA

Compound	Cure at 280° F., Min.	I-50, Psi.	R-50, Psi.	I-50 / R-50	Set, %
N	10	138	74	1.87	6
	20	178	111	1.60	4
	40	204	118	1.73	4
	60	200	111	1.80	4
	80	181	105	1.72	4
	100	170	96	1.77	4
NR-50	10	112	9	12.43	31
	20	168	46	3.65	15
	40	220	77	2.86	11
	60	226	80	2.82	11
	80	229	80	2.86	11
	100	229	80	2.86	11
S	10	61	—	—	—
	20	75	—	—	156
	40	138	58	2.38	10
	60	165	98	1.68	5
	80	190	117	1.62	4
	100	195	125	1.56	4
SR-50	10	91	—	—	149
	20	122	3	40.65	47
	40	177	51	3.47	14
	60	200	72	2.78	12
	80	209	76	2.75	11
	100	214	80	2.68	11

These data are valuable, not only with respect to hysteresis, but also with respect to rate of cure. The hysteresis ratio of compound N, for example, passes through a minimum at the 20 minute cure, indicating reversion beyond that point. For compound NR-50 the ratio shows a plateau beginning with the 40 minute cure, and for the two GR-S compounds it continues to fall off slowly in the overcures.

Figure 10 plots the hysteresis ratios, using values for selected, comparable states of cure as follows:

Compound	Selected Cure, Min.	Hysteresis Ratio
N	20, 40	1.67
NR-50	40	2.86
S	40, 60	2.03
SR-50	60	2.78

This selection of cures is necessary because the natural rubber compound N shows some reversion in the overcures, as has just been pointed out. The other three compounds do not show reversion.

The natural rubber compound is shown to have a lower hysteresis ratio than the GR-S compound S. With the reclaim stocks, however, the differences between the base hydrocarbons are minimized to such a degree that they are not significant.

This inclined plane hysteresis test may have advantages and may be presenting reclaim—GR-S blends in a truer light than other tests, since it is known that satisfactory mechanical goods and tire compounds are being made and have been made containing such blends.

Summary of Results

1. All five test methods show that the natural rubber

[7] "Determination of Intrinsic Low Stress Properties of Rubber Compounds. Use of Inclined Plane Tester." *Rubber Chem. Tech.*, 24, 820 (1951).

control compound, X, gives lower hysteresis than the GR-S control compound, S.

2. Four of the five methods (1, 2, 3, and 4) show that natural rubber gives lower hysteresis than GR-S also with 25% substitution of both rubbers by reclaimed rubber on an equal RHC basis.

3. Two of the five methods (3 and 4) show that natural rubber gives lower hysteresis than GR-S also with 50% substitution of both rubbers by reclaim.

4. The Dunlop pendulum shows the natural rubber compound containing reclaim in 25% substitution to have a hysteresis nearly as low as that of the straight GR-S control. The absolute hysterometer shows the same compound to have a hysteresis actually lower than that of the GR-S control.

5. Methods 1 and 2 agree essentially for all compounds.

6. Method 3 magnifies the difference between natural rubber and GR-S in the reclaim compounds.

7. Method 4 minimizes the difference between natural rubber and GR-S in the control compounds.

8. Method 5 shows no significant difference between natural rubber and GR-S in the reclaim compounds. It is especially accurate in determining rate of cure, as modulus at low elongation is accurately determined by the Inclined Plane Tester.

Acknowledgments

Thanks go to all the men named in this paper for having done the work indicated. S. M. Cadwell, director of research and development, United States Rubber Co., kindly arranged for the tests made under the direction of Dr. Mooney. R. S. Havenhill, St. Joseph Lead Co., kindly reviewed the manuscript with particular reference to the flexometer data. G. C. Maassen, R. T. Vanderbilt Co., R. E. Rude, Armstrong Rubber Mfg. Co., Des Moines, Iowa, and R. E. Cartlidge, of Midwest, all gave helpful advice and encouragement. G. K. Trimble, president of Midwest, kindly reviewed the manuscript and released it for publication.

Storage Stability

(Continued from page 794)

the raw polymers on the elongation of the vulcanizates was pronounced only with the X-632 compounds. From these data, it appears that Butyl ages only slightly poorer than XP-155 (polybutadiene) and X-624 (GR-S-100). The X-632 was affected most by the heat treatment.

Summary and Conclusions

Mooney viscosity, chemical test, and stress-strain determinations conducted on various lots of GR-S-1000, GR-S-1003, and GR-S-1004 (GR-S-AC) polymers revealed that little change in polymer properties occurred during storage periods as long as five years. Good storage stability, as judged by Mooney viscosity data, was also indicated for various experimental polymers prepared at the Government Laboratories. Polybutadiene and copolymers of butadiene and styrene, α-methyl styrene, monochlorostyrene, dichlorostyrene, and vinylpyridine showed little change in viscosity. Differences of ±15 ML-4 Mooney viscosity units occurred with butadiene/isoprene copolymers and a butadiene/styrene/vinylpyridine tripolymer during about five years, and a tripolymer of butadiene/styrene/divinylbenzene proved to have poor aging properties by increasing in viscosity 48 ML-4 units during 39 months' storage.

Accelerated aging by treatment of the raw polymers for 48 hours at 212° F. in air caused relatively large changes in Mooney viscosity for GR-I-18, GR-S-1000 (X-603), and GR-S-1500 (X-632); whereas the viscosities of another GR-S-1500 polymer (X-624) and a polybutadiene (XP-155) remained constant. Even with these large changes in Mooney viscosity, however, the stress-strain properties for vulcanizates of the pretreated GR-I-18 and X-603 did not differ radically from those for vulcanizates of the untreated polymers. The X-632 vulcanizates for the treated and untreated stock underwent the largest change, a loss of about 50% of the original tensile strength during accelerated aging.

Letter to the Editors

To the Editors of "Rubber World,"
New York, N. Y.

Dear Sirs:

Referring to Mr. Seaman's article in your periodical, the (India) Rubber World, April, 1954, p. 65, in which opinion of the readers was asked on the possible value of rubber technology diplomas in the United States, I have the pleasure to offer herewith my response, entitled:

"Are Rubber Diplomas Desirable in the United States?"

Your readers may be interested to know the background of present-day arrangements in Europe. The need of establishing and coordinating training facilities in rubber science and technology in the various countries, and for offering a mutually recognized award, had long been felt in Europe, and the International Education Committee was set up in 1951 under the aegis of the Institution of the Rubber Industry, London, to inquire into the possibility of setting up courses (working to a common syllabus) followed by an examination set to an agreed standard.

The intention of the Committee was not to take over the I. R. I. diplomas—the condition of which is membership of the Institution—but for each country to issue its own diplomas set to a uniform standard.

In this Committee the following countries are represented: Belgium, Denmark, France, Great Britain, Holland, Indonesia, Italy, Japan, Norway, Sweden, Switzerland, and Western Germany.

All these countries have since agreed in principle to establish in their territories proper educational facilities for the training of rubber technologists, and to prepare candidates for the same examination, marked and assessed on the same basis. The candidates who complete the courses are eligible to sit the examination and receive the same standard of attainment in all collaborating countries.

The first "international" examination was held in June, 1954, and candidates from the British Empire, Holland, Indonesia, and Western Germany took part. The other participating countries expect to put forward candidates next year and thereafter.

What is the great benefit of this system? First, the technical training will be undertaken by recognized bodies, leading to a sound theoretical and practical education. Second, the prospect of a diploma award, recognized by the rubber manufacturing industry of all coun-

(Continued on page 852)

Aconitic and Tricarballylic Acid Esters as Vinyl Plasticizers

By E. J. Roberts,[1] L. F. Martin,[1] Frank C. Magne,[1] *and* Robert R. Mod[1]

ACONITIC acid from a natural source has been made available recently by the commercial recovery of calcium-magnesium aconitate from sugar-cane molasses (1, 2).[2] The form which apparently accumulates in the plant, and which is commercially available, is trans-aconitic acid. This acid has also been produced by the dehydration of citric acid (3). Hydrogenation of aconitic acid or its esters readily yields tricarballylic acid or the corresponding tricarballylates. Although one of the principal uses for aconitic acid is in the production of esters of high molecular weight which are of value as plasticizers (4, 5), there is little information in the literature on the preparation and properties of these esters. Scattered references to the evaluation of some of these triesters as plasticizers have appeared in the literature (6, 7), but the source of the products and their physical constants are not always given.

The methyl, ethyl, propyl, and allyl triesters of both acids have been described (8-13). Of the higher alcohols, only the amyl and 2-ethylhexyl triesters have been reported (13, 14), but the physical properties are not given in these reports. Plasticizer screening tests with 95% vinyl chloride copolymer and some physical constants of n-propyl, n-butyl, n-amyl, isoamyl, mixed amyl, n-hexyl, and 2-ethylhexyl triesters of aconitic and tricarballylic acids here described have been reported by Magne and Mod (15) in a previous communication from this laboratory. Methods are given in the present paper for the preparation and purification of a series of esters of aconitic and tricarballylic acids. The results of plasticizer screening tests on the remaining esters with vinyl resin and vapor pressure determinations on some numbers of this series are also presented.

Preparation of Esters

Aconitic and tricarballylic esters can be prepared by two methods: (a) direct esterification of aconitic acid and subsequent hydrogenation to the tricarballylate; and (b) direct esterification of dicalcium magnesium aconitate. These methods are described in detail, together with a procedure for the preparation of mixed esters of tricarballylic acid. Specific experimental details are given since it has been the experience of the authors that strict adherence to the procedures is necessary if the results are to be duplicated.

Data on distillation values and physical properties of aconitic and tricarballylic acid triesters are given in Table 1.

Esterification of Aconitic Acid

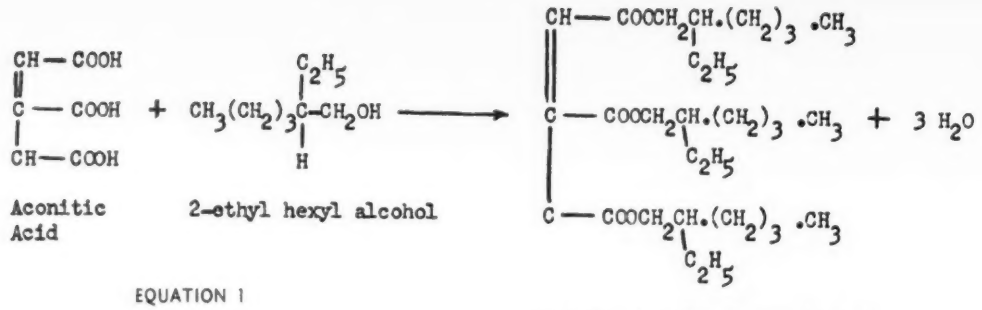
The preparation of tri-2-ethylhexyl aconitate and tricarballylate is illustrative of the procedure used in the synthesis of these esters. A mixture of 174 grams (one mole) of aconitic acid, 430 grams (3.3 moles) of 2-ethylhexyl alcohol, two grams of p-toluenesulfonic acid, and 200 milliliters of toluene was placed in a two-liter three-necked flask fitted with a stirrer and reflux condenser with return through a water trap. The mixture was heated with constant stirring under reflux until no more water was accumulated, and the titer of an aliquot was equivalent only to the amount of p-toluenesulfonic acid present. The solution was cooled and washed once with water, three times with 5% sodium hydroxide solution, and again with water until neutral. (See Equation 1.)

The toluene and excess alcohol were removed by distillation under approximately 15 millimeters' pressure until the temperature rose 10° C. above the atmospheric boiling point of the alcohol. The crude ester was distilled in an apparatus especially designed to minimize the number of joints and other connections and to permit distillation at as low a pressure as feasible, with fractionation through a Vigreux column 33 centi-

ESTERS of aconitic acid and mixed esters of the corresponding tricarballylates obtained by hydrogenation of the aconitic acid esters have been prepared using alcohols ranging from propyl to octyl.

These esters have been screened for use as plasticizers for polyvinyl chloride acetate plastic, and the results indicate that some of them may be used in place of di-2-ethyl hexyl phthalate plasticizer.

[1] Southern Regional Research Laboratory, United States Department of Agriculture, New Orleans 19, La.
[2] Numbers in parentheses refer to Bibliography at end of article.



Aconitic Acid — 2-ethyl hexyl alcohol — Tri-2 ethyl hexyl aconitate

EQUATION 1

meters long, 35 millimeters in diameter, and provided with a heating element (16). A side arm 13 millimeters in diameter and 20 centimeters long served both as a condenser and connection to the receiver.

The distilling temperature, which was taken with a thermometer in an oil-filled, sealed-in thermometer well, varied markedly with changes in rate of distillation, but was practically constant at any given rate. At a distillation rate of 100 drops per minute, tri-2-ethylhexyl aconitate distilled at 190° C. at 50 microns receiver pressure. The yield of distilled ester was 441 grams, or 86% of theory. When esters of secondary alcohols are prepared, the toluene should be omitted, and a large excess of the alcohol used.

In a separate preparation the crude tri-2-ethylhexyl aconitate, 546 grams, was hydrogenated before distillation with 1.50 grams of 10% palladium on activated carbon as the catalyst. This catalyst may be reused with full activity in at least five successive hydrogenations. Hydrogenation of the ester proceeded at a rate of approximately 0.24-mole of hydrogen per hour in a Parr apparatus at 150° C. without a solvent. The catalyst was filtered off, and the ester was distilled as previously described. At a distillation rate of 100 drops per minute, tri-2-ethylhexyl tricarballylate distilled at 191° C. at eight microns receiver pressure. The yield of distilled ester was 492 grams, or 96% of theory.

Esterification of Dicalcium Magnesium Aconitate

Aconitic triesters may be prepared directly from commercially available dicalcium magnesium aconitate without the isolation and purification of the acid. The preparation of tri-n-butyl aconitate directly from the salt will serve to illustrate this procedure. (See Equation 2.)

A mixture of 554 grams (one mole) of dicalcium magnesium aconitate, 244 grams (3.3 moles) of n-butyl alcohol, and 1,000 milliliters of toluene was placed into a three-liter three-necked flask fitted with a stirrer, dropping funnel, and reflux condenser with return through a water trap. The stirrer was started, and when the toluene began to reflux, 320 grams (theory plus 10%) of concentrated sulfuric acid were added slowly from the dropping funnel.

Heating was continued with constant stirring until no more water was collected, and titration of an aliquot of the solution indicated that the reaction was complete. The inorganic salts were filtered off and washed free of ester with commercial hexane. The filtrate and washings were combined, washed free of acidity, and distilled after the removal of the solvent and excess alcohol, as previously described. At a distillation rate of 100 drops per minute, tri-n-butyl aconitate distilled at 140° C. at six microns receiver pressure. The yield of distilled ester was 540 grams, or 82% of theory.

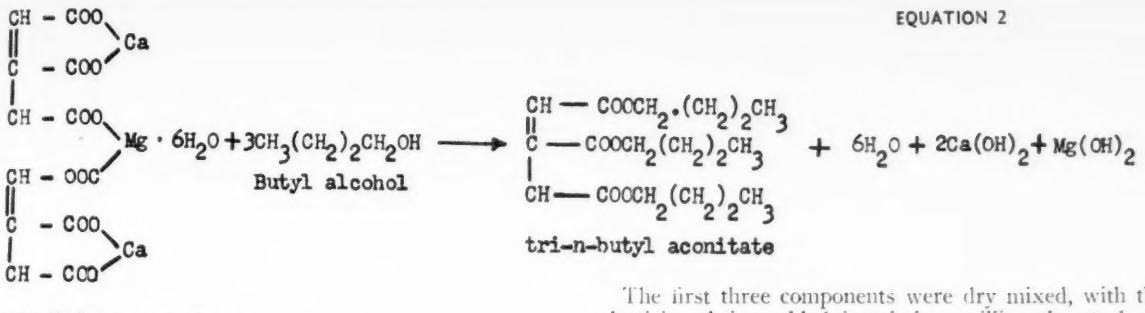
TABLE 1. DISTILLATION VALUES AND PHYSICAL PROPERTIES OF TRIESTERS OF ACONITIC AND TRICARBALLYLIC ACIDS

Ester	Saponification Equivalent		Distillation			Boiling Point (at 0.1-Mm.), °C.	Density (25° C.)	Refractive Index	Yield, %
	Calculated	Found	Temp., °C.	Receiver Pressure, Microns†	Rate, Drops per Min.				
Aconitates:									
n-Propyl	100	101.8	105	15	80	99	1.0556	1.45312	90.0
n-Butyl	114	115.4	143	6	100	126	1.0138	1.45415	95.0
n-Amyl	128	130.8	147	25	80	148	0.9912	1.45582	80.0
Isoamyl	128	127.7	145	12	80	138	0.9867	1.45380	85.6
Mixed amyl*	128	130.1	145	25	100	138	—	1.45481	—
n-Hexyl	142	143.0	165	25	68	165	0.9725	1.45686	76.8
4-Methyl-2-pentyl	142	143.2	140	20	100	131	—	1.44963	80.0
2-Ethyl hexyl	170	172.4	189	45	100	184	0.9540	1.46058	86.0
Capryl	170	172.3	165	30	100	—	—	1.45444	—
Allyl	98	99.8	130	50	100	108	1.1032	1.48070	76.5
Ethoxyethyl	—	—	170	32	100	—	—	—	63.0
2-Ethylbutyl	142	143.4	165	35	100	—	—	—	90.3
Tricarballylates:									
n-Propyl	100.6	101.6	110	8	96	101	1.0479	1.44183	95.0
n-Butyl	114.6	115.0	140	8	100	125	1.0025	1.43969	—
n-Amyl	128.6	129.6	152	5	104	143	0.9812	1.44306	—
Isoamyl	128.6	128.3	142	8	80	138	0.9771	1.44132	97.0
Mixed amyl*	128.6	129.3	145	14	100	138	—	1.44302	—
n-Hexyl	142.6	142.0	168	8	64	—	—	1.44551	—
4-Methyl-2-pentyl	142.6	141.8	145	15	100	132	—	1.43894	91.0
2-Ethyl-hexyl	170.6	169.0	191	8	100	181	0.9482	1.45135	96.5
Capryl	170.6	168.8	175	5	110	—	—	1.44513	—
Allyl	98.6	99.0	132	12	100	—	—	—	80.0
2-Ethylbutyl	142.6	143.0	165	20	100	—	—	—	91.4
Ethyl-di-n-octyl	142.6	141.7	175	10	100	154	—	1.44558	32.0

*Mixed branch primary amyl.

†The pressure exerted by a column of Hg 1 μ high; a unit of high vacua.

EQUATION 2



Dicalcium magnesium aconitate hexahydrate

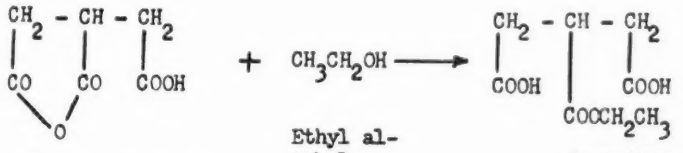
Butyl alcohol

tri-n-butyl aconitate

Preparation of Mixed Esters

While no effective method was found for the preparation of mixed esters of aconitic acid, the preparation of ethyl di-n-octyl tricarballylate is illustrative of the general method for the preparation of mixed esters of tricarballylic acid. (See Equation 3, below.)

EQUATION 3



Tricarballylic acid anhydride

Ethyl alcohol

Monoethyl tricarballylate



Monoethyl tricarballylate

n-octyl alcohol

Ethyl di-n-octyl tricarballylate

Three moles (474 grams) of tricarballylic acid anhydride (17) were dissolved in two moles (276 grams) of absolute ethyl alcohol by warming gently. After the solution stood for 24 hours, the excess alcohol was removed under vacuum, and 715 grams (5.5 moles) of n-octyl alcohol, 500 milliliters of toluene, and six grams of p-toluenesulfonic acid were added. Esterification was completed in accordance with the procedure for aconitic acid esters. The solution was washed free of acidity; the solvent and excess alcohol were removed, and the ester was fractionated. The fraction that distilled at 174-185° C. at a rate of 100 drops per minute and a receiver pressure of 10 microns was then refractionated. The yield of pure ester, distilling at 174-176° C. at the above rate and pressure, was 400 grams, or 32% of theory.

Plasticizer Evaluation

The triesters were screened as plasticizers for Vinylite VYDR,[3] using the following formulation:

Vinyl resin VYDR (95% polyvinyl chloride, 5% polyvinyl acetate copolymer)	63.5%
Basic lead carbonate	1.0%
Stearic acid	0.5%
Plasticizer	35.0%

The milling and molding procedures were the same as previously reported (15), as follows:

The first three components were dry mixed, with the plasticizer being added just before milling the stock on a 12- by 6-inch mill at 300° F. The sheet material was then molded in a standard 6- by 6- by 0.075-inch four-cavity mold, with several layers of sheet (with milling axes parallel) being placed in each cavity to fill the mold. Mold pressure was brought up to 500 psi. over a 10-minute period and held for an additional 10 minutes at the molding temperature of 300° F. The molds were cooled before pressure was released.

The measurements for tensile strength, modulus at 100% elongation, and ultimate elongation were determined on an IP-4 Scott tester at a loading rate of 200 pounds per minute at 70° F. and 65 ±2% relative humidity, with specimens equilibrated to these conditions for 24 hours prior to the test. The brittle points (ASTM D746-44T) were determined on specimens die-cut from the molded sheets. The vapor pressures reported were read from linear plots of the experimental tensimeter data (15).

The data reported in Table 2 indicate that most of these triesters with the exception of the ethoxyethyl, 4-methyl-2-pentyl and ethylbutyl aconitate, and the 4-methyl-2-pentyl tricarballylate, are equal to or better than di-2-ethylhexyl phthalate (DOP) in such plasticizing characteristics as tensile strength, modulus, elongation, and brittle points.

Most of these esters were compatible with the vinyl resin. The tricapryl esters were completely incompatible and could not be milled with the resin; while triethoxyethyl aconitate and triallyl tricarballylate bled or spewed from the molded sheets after several months of storage at room temperature. The molded sheets were opaque; the color ranged from white to cream.

On the whole, the results on these esters seem to bear out the conclusion previously reported (15) that normal

[3] Product of Bakelite Co. References to specific products of commercial manufacture are for illustration only and do not constitute endorsement by the U. S. Department of Agriculture of the products named.

esters are generally better than the corresponding branched-chain esters of aconitic and tricarballylic acids in their overall plasticizing characteristics.

Summary and Conclusions

Methods are described for the preparation of triesters of aconitic acid in good yield directly from the acid or the commercially available salt, and for the hydrogenation of these esters to the corresponding tricarballylates. A method is described for the preparation of mixed esters of tricarballylic acid. A modification of the method has been described for obtaining satisfactory yields of esters of secondary alcohols of higher molecular weight.

A series of esters of alcohols ranging from propyl to octyl has been prepared and purified by distillation to obtain products of sufficient purity for determination of physical properties which have not hitherto been reported. These esters have been screened for their plasticizing characteristics with polyvinyl chloride acetate (95:5) copolymer, and the results indicate that some may be used in place of di-2-ethylhexyl phthalate.

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TABLE 2. PLASTICIZING CHARACTERISTICS OF TRIESTERS OF ACONITIC AND TRICARBALLYLIC ACIDS

VAPOR PRESSURE OF SELECTED TRIESTERS

Plasticizer	Conc., %	Tensile Strength, Psi.	100% Modulus, Psi.	Elongation, %	Brittle Temp., °C.	Boiling Points, °C., at Specified Pressures (Mm.) 0.04	0.1	0.5	1.0	5.0	10.0
Aconitates:											
Allyl	35	3184	1446	346	−40	108	133	*145	*176	*191	—
Ethoxyethyl	35	†3105	1744	321	−20						
4-Methyl-2-pentyl	35	2977	2234	244	−17	117	131	159	171	205	221
2-Ethylbutyl	35	3058	1758	309	−36						
Capryl	35	Incompatible									
Tricarballylates:											
Allyl	35	†3270	1484	311	−44	—	—	—	—	—	—
Ethyoxyethyl	35	2950	1393	342	−33	—	—	—	—	—	—
4-Methyl-2-pentyl	35	2847	1976	240	−19	117	132	159	172	205	221
2-Ethylbutyl	35	2844	1522	334	−39	—	—	—	—	—	—
Capryl	35	Incompatible									
Ethyl di-n-octyl	35	2911	1356	316	−44	150	165	193	206	241	257
DOP (Control)	35	3040	1550	330	−33	141	154	181	193	224	239

*Some polymerization took place.
†Bleeds and sweats after storage in room temperature.

Meetings and Reports

Building Research Institute Plastics Meeting in October

The Building Research Institute will conduct a conference evaluating the role of plastics in home, industrial, and institutional construction, at the National Academy of Sciences in Washington, D. C., October 27 and 28. Sponsored by the Society of the Plastics Industry, Inc., the Manufacturing Chemists' Association, and the Building Research Advisory Board, the meeting is the first of its kind and will be of particular interest to architects, designers, engineers, and builders.

Speakers will be acknowledged leaders in the plastics and building industries, it is reported, and discussion periods are planned to explore the practical applications and theoretical possibilities of plastics materials and products. The Institute is a section of the Division of Engineering & Industrial Research of the National Academy of Sciences, National Research Council, and this conference will be its seventh major one.

Four major aspects of "Plastics in Building" will be considered: an introduction to the subject; applications; standards and codes; and the future role of plastics. Such subjects as piping, glazing, flooring, walls and partitions, ceilings, roofing, ductwork, insulation, and structural parts of buildings will be explored.

The agenda of the conference is as follows:

October 27

"Introduction to Plastics in Building"

"Kinds of Plastics," E. B. Cooper, manager, application research division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

"Engineering and Design with Plastics," Albert G. H. Dietz, Department of Civil & Sanitary Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

"Evaluating Plastics for Building Application," Tyler S. Rogers, technical consultant, Owens-Corning Fiberglas Corp., Toledo, O.

"Specific Applications of Plastics in Building"

"Light-Transmitting Panels," John S. Berkson, president, Alsynite Corp. of America, San Diego, Calif.

"Glazing and Interior Illumination," O. L. Pierson, Rohm & Haas Co., Bristol, Pa.

"Thermal Insulators and Vapor Seals," R. N. Kennedy, expanded plastics division, Dow Chemical Co., Midland, Mich.

"Structure Panels," A. T. Waidelich, vice president and manager, Austin Co., Cleveland, O.

"Surfacing and Decorative Uses," Hiram McCann, editor, *Modern Plastics*, New York, N. Y.

October 28

"Specific Applications" (*Cont'd*)

"Plastic Piping," John S. Whitaker, Bakelite Corp., Bloomfield, N. J.

"Plastic Ducts and Conduits," Raymond B. Seymour, executive vice president

and general manager, Atlas Mineral Products Corp., Mertztown, Pa.

"STANDARDS AND CODES FOR PLASTICS IN BUILDING"

"Standards for Plastic Products," Gordon M. Kline, chief of the Organic & Fibrous Materials Division, National Bureau of Standards, Washington.

"Building Codes," F. J. Rarig, assistant secretary, Rohm & Haas, Philadelphia, Pa.

"FUTURE USES OF PLASTICS IN BUILDING"

"Future of Plastics in Building," Johan A. Bjorksten, president, Bjorksten Research Laboratories, Madison, Wis.

"Round-Table Discussion on Future of Plastics in Building," Dr. Bjorksten; George Clark, vice persident, Formica Co., Cincinnati, O.; and Raymond Foster Boyer, director, physical research laboratory, Dow Chemical.

"Summaries of the Conference." (Speakers not yet chosen.)

ASME-SPE Plastics Symposium Set for New York, September to November

A plastics symposium which will provide, insofar as possible, a series of papers on all branches of the plastics industry has been organized by the Metropolitan Section of the American Society of Mechanical Engineers in conjunction with the Newark and New York sections of the Society of Plastic Engineers. A total of 16 addresses will be presented over the two-month period from September 20 through November 15 at the Engineering Societies Bldg., 29 W. 39th St., New York, N. Y.

Eight sessions have been scheduled for each Monday night except October 25 over the nine-week period. Three addresses will be presented on October 4 and a review on November 15, with two addresses each scheduled for the other sessions on the program.

The symposium has been set up by Henry Scagnelli (Sonatone Corp.), chairman of the Machine Design Division of the Metropolitan Section, ASME, and J. H. Du Bois (Mycalex Corp. of America), of the Newark Section, SPE. Mr. Du Bois will act as general conducting chairman for the event.

In addition to members of the organizations associated with the symposium, all interested parties are invited to attend. The papers to be given, and their abstracts, are as follows:

SEPTEMBER 20

Plastics Industry. Hiram McCann, editor, *Modern Plastics.*

The components of the industry and the statistics and inter-relation that exists between the various components will be covered in this initial address, along with a presentation of plastic products to illustrate the talk.

The Organic Plastics. Henry M. Richardson, DeBell & Richardson.

The chemical structure of synthetic resins and the advantages and disadvantages of plastics in general will be discussed with a view toward informing the mechanical engineer of the capabilities of these materials. The presentation will include a running picture of fabrication methods used by the industry.

SEPTEMBER 27

The Ceramic Products. A. J. Monack, professor, Newark College of Engineering.

The properties of ceramics, which make them useful as high-temperature insulators where strength and dimensional precision are of secondary importance, and of glass-bonded mica will be considered in this address.

The Cold Mold Plastics. Leon R. Egg, Garfield Mfg. Co.

As the first plastics, these materials (which are pressed into shape and then cured) will be discussed from both an economic and application viewpoint. These plastics have found acceptance where arc resistance in electrical products and operation at elevated temperatures in other products (but not appearance or dimensional control) are required.

OCTOBER 4

Natural and Synthetic Rubber Products. D. E. Jones, American Hard Rubber Co.

The uses of various rubbers and the ingredients which must be added to obtain a rubber of specific properties are to be covered in this address. Specialty synthetic rubbers for exacting service applications will also be dealt with.

Silicone Rubber. Alex E. Javitz, special features editor, *Electrical Manufacturing.*

The properties and applications of the silicones and of silicone coated glass-fabric materials, products which have come into wide use in the past few years, will be covered by Mr. Javitz.

The Elastomers and Non-Rigid Plastics. J. K. Honish, Bakelite Corp.

Polyethylene, vinyl, and fluorinated compounds are to be discussed, with properties and applications.

OCTOBER 11

The Cast Plastics. M. Wismer, Ciba Co., Inc.

Capable of being poured into molds and subsequently hardened by a chemical reaction involving a catalyst, cast plastics are finding wide use in toolmaking and as potting compounds.

Fabricated Parts. J. E. Niemeth, Insulating Fabricators Co.

Fabrication by common machining operations of laminated plastics, fiber-treated papers, and different types of plastic sheeting into high-strength, low-cost products with good dimensional control will be covered in this address, along with design considerations and examples of such plastic fabrication.

OCTOBER 18

The Thermosetting Plastics. S. E. Tinkham, Boonton Molding Co.

The methods of molding and the properties of the finished product made from these materials (phenolics, melamine, and ureas), along with design and economic considerations, are the topics for this session.

The Thermoplastic Products. John LaBelle, Foster Grant Co.

Advantages and limitations of these materials as well as design and economic factors will be considered by Mr. LaBelle in this paper.

NOVEMBER 1

The Reinforced Plastics. Isaac Kinsey, Owens Corning Fiberglas Corp.

The structural features of the glass-fiber polyester resin materials, as well as tooling, cost, and design considerations, are to be dealt with by Mr. Kinsey.

Extrusion Plastics and Blownware. George Pickering, Plax Corp.

The thermoplastics capable of being extruded, blown, and vacuum formed will be discussed, and the problems associated with these operations will be covered.

NOVEMBER 8

Appearance Design to Prototype. Edward Ferrari, General Electric Co.

The use of cast plastics and simple plaster molds to produce low-cost prototypes will be discussed, and a demonstration of a simple process useful in this respect will be given.

Material Selection Considerations. Mr. Du Bois.

Balancing various properties to obtain the best possible for a given product will be the problem covered in this address. The speaker will take into account cost considerations as the most important in such projects.

NOVEMBER 15

Review Forum and Exhibit.

All speakers of the symposium will be present for a round-table discussion on questions resulting from the entire program. In addition the SPE sections will provide an exhibit of plastics products.

Associated Company to Make Dow Styron in Britain

Formation of an associated company to manufacture Styron, Dow's polystyrene plastic, for molders in Great Britain has been announced by Dow Chemical Co., Midland, Mich. To be known as Distrene, Ltd., the new company is jointly owned by Distillers Co., Ltd., Edinburgh, Scotland, and Dow, the latter having a 45% interest, and will build a plant at Barry, South Wales, expected to be completed by the end of 1955.

The firm will produce Styron 666, general-purpose molding granules, and Styron 475, high impact strength granules for molders of such items as housewares, wall tiles, toys, refrigerator parts, and many industrial moldings. The British parent company has been manufacturing polystyrenes and phenolic resins since 1940; Dow entered the plastics field about the same time, and its Styron is now being made in plants at Midland, Mich., Allyn's Point, Conn., Torrance, Calif., and Sarnia, Ont., Canada.

Distrene's board of directors includes three Dow executives: N. R. Crawford, president of Dow Chemical of Canada, Ltd., a Dow subsidiary; William H. Schuette, manager of plastics production; and A. E. Young, an assistant manager of the plastics department. Also on the board are C. J. P. Ball, H. H. Woolveridge, P. A. Delafield, and J. H. P. Staudinger, all from Distillers Co.

Tube Turns Plastics, Inc., Organizes for Injection Molding Rigid PVC

The manufacture of industrial plastic pipe fittings and custom molded products through a new patented process of injection molding of unplasticized polyvinyl chloride has been announced by Tube Turns Plastics, Inc., Louisville, Ky., a recently organized company that will serve the oil, paper, chemical, food, and allied industries.

Reported to be capitalized at $1,500,000, the company was established jointly by Tube Turns Division of National Cylinder Gas Co., Louisville, and Jackson & Church Co., Saginaw, Mich. David L. Perrot was elected chairman of the board, and George O. Boomer was named president. Mr. Perrot is currently chairman of the board and executive committee of Jackson & Church Co. Mr. Boomer is at present chairman of the executive committee of National Cylinder Gas Co. and president of Girdler Co., a subsidiary of National Cylinder.

Tube Turns Plastics will be the only source of injection molded polyvinyl chloride fittings manufactured on a commercial scale, officials of the firm say. Its patented preplasticizing process was originally developed by James W. Hendry, vice president of Jackson & Church. The company will also make fittings and custom molded products from other thermoplastics and from thermosetting plastics.

Piping systems fabricated from polyvinyl chloride are said to offer exceptional resistance to a wide range of acids and alkalies, better than high-grade steel and alloys in some cases. Other advantages cited are high burst and impact strength, lightness of weight, impermeability to weather, and easy installation.

Other officers elected to the new company were Carl McLaughlin, executive vice president, and Mr. Hendry and John G. Seiler, vice presidents. C. J. Haines and Clifford W. Stuart will complete the directorate.

Kreidl Process Demonstrated

A new machine for applying the Kreidl Process of treating polyethylene film and coated paper to improve adhesion of glues and printing inks was demonstrated by Frank W. Egan & Co., Bound Brook, N. J., during the week of August 2. According to Frederick Hartmann of Kreidl Chemico-Physical Co., holder of the patent, the demonstration was viewed with great interest by some 60 representatives of film, tubing, and coated polyethylene firms. The Process, essentially a differential heat treatment, was performed with the new machine, which incorporates heating, cooling, unwinding, and rewinding mechanisms in one integrated unit.

Built by Egan for use by licensees of the Process, the machine was designed by F. J. Meyer, of Texas Plastics, Inc. The first machine has been purchased by Texas Plastics, a subsidiary of F. H. Vahlsing Corp., for use in the polyethylene-bag printing line being installed in the company's new plant at Elsa, Texas.

Develop Method for Reproducing Small Machine Parts

A rapid and economical method for reproducing intricate machine parts and for potting electronic components has been developed by Houghton Laboratories, Inc., Olean, N. Y. The part is reproduced with low-temperature-cure Bakelite C-8 epoxy resins in a flexible mold made from Bakelite vinyl resin-base plastisols. Potting is achieved with the same materials after a hand-modeled master mold of Bakelite vinyl resin-base plastigels has been constructed.

The new technique reportedly permits short production runs to take place at a cost far cheaper than those employing metal molds. The low-temperature cure and low shrinkage of the epoxy resins do away with costly mold heating equipment, it is said, and the resulting parts, such as gears, cams, and bobbins, are lightweight, have considerable shear strength, and exhibit excellent dimensional stability. Expensive split molds for severely undercut parts are eliminated through the use of the vinyl resin-base plastisols.

Potting in Bakelite epoxy resins provides electronic and electrical components with a shock, chemical, and moisture-resistant bed, and the use of the flexible plastisol molds is said to supply a low-cost accommodation to rapid changes habitually made in electronic component design. Prototype, experimental, and contract models can also be produced inexpensively by this method. The gradual extraction of plasticizer from the mold limits the number of runs, but an average of five castings or potted assemblies is claimed for each mold.

The method for reproducing a machine part, as reported by its developer, consists in first pouring fluid Bakelite vinyl resin-base plastisol around the object and curing it at 350° F. for 15-20 minutes; the container used allows for a mold thickness of ¼-inch. Curing completed, the original mold pattern is removed, and cold-setting Bakelite epoxy resin is poured into the resulting mold cavity. Houghton Laboratories' Hysol 6020, formulated with a Bakelite epoxy resin and hardener to set at room temperature, is said to gel in 1-3 hours and harden three hours later at room temperature.

Potting of electrical components is reported to be accomplished by the same method, except that a hand-molded master model of the completely potted assembly is first made. Bakelite vinyl resin-base plastigels can be used for this purpose; the master model shapes the cavity in the flexible mold into which the electrical assembly is placed, and the epoxy resin is then added. An ordinary oven is sufficient to harden the master model. Rectifiers, transformers, antenna masts, deflection yokes, and resistors are examples of small assemblies that can be potted.

Although a low shrinkage is claimed for epoxy resins, shrinkage of the flexible plastisol mold, a maximum of 0.005-inch, is too great for the casting of high-precision parts. Epoxy resins are said to be especially useful for potting of such electronic components as transistors.

Plasticizers DIDP and DIDA Resist Alkali in Tests

Tests conducted on two polyvinyl chloride plasticizers, di-isodecyl phthalate (DIDP) and di-isodecyl adipate (DIDA), show them to be unusually resistant to extraction by soapy water and alkali, according to the organic chemicals division of Monsanto Chemical Co., St. Louis 4, Mo.

This property makes these plasticizers particularly valuable in the manufacture of plastic film and sheet from which floor tile, upholstery, shower curtains, table covers, and baby pants are made, where flexibility must be retained after frequent washing, the company says.

Monsanto's tests consisted of immersing 40 mil film into a standard 1% solution of Ivory Flakes for 24 hours at 50° C. and determining the percentage of plasticizer lost by weighing the samples before and after immersion. Film containing dioctyl adipate (DOA) showed an 8.15% loss of plasticizer, and that compounded from dioctyl phthalate (DOP) exhibited a loss of 2.67%. On the other hand, the company reports, the loss of DIDA was only 1.74%, and that of DIDP a mere 0.02%.

The experimental formulations were made up of 100 parts of Monsanto's Opalon 300 vinyl chloride resin, varying amounts of the plasticizers to be tested, and ½-part of DS-207 heat stabilizer.

Ultron Rigid Vinyl Sheets

Production of rigid Ultron vinyl sheets (Ultron R 309) has been announced by the plastics division of Monsanto Chemical Co., Springfield, Mass. The material has good light stability, a high heat distortion point, and a low static charge, the company reports, and is particularly adaptable to advertising displays, decorations, and calendar cards. Ultron R 309 is being made in matte finish opaque white for the printing industry, and in calendered translucent white, in various gages. Monsanto also recommends its use as corrugated strips for fluorescent light diffusion.

Computation Aid Available

A slide-gage conversion chart showing at a glance the amounts of resin and accelerator required to produce a cast phenolic part of any size is being offered by Marblette Corp., Long Island City, N. Y. Created by the Perrygraf Corp., the chart includes tables listing the percentage by weight of the appropriate hardener to be used with specific Marblette phenolic casting resins.

Other tables give applications of each resin, physical properties, viscosities, weight conversions, and cubic area determinations.

Gets Foam Vinyl License

A license to engage in development work on Elastomer Chemical Corp.'s patented continuous foam vinyl process has been granted The B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O. It was stated further that Goodrich Chemical's technical staff is prepared to render service to other licensees on the application of Geon vinyl dispersions to this process.

The process consists of dissolving inert gas under pressure in a vinyl plastisol and releasing the foamed plastisol through a spray nozzle into a mold or on to a casting surface and fusing to form the finished product.[1]

[1]See our Feb., 1954, issue, p. 628.

Scientific and Technical Activities

Tracerlab Schedules Symposium for October 6-8

A symposium on the applications of radioactivity in the rubber and plastics industries, sponsored by the technical division of Tracerlab, Inc., will be held at the Sheraton Plaza Hotel, Boston, Mass., October 6-8. Speakers will include experts in both private industry and government service. A $20 admission fee covers abstracts of the talks and attendance at the banquet and cocktail hours.

Reservations may be obtained from the symposium committee, technical division, Tracerlab, Inc., 130 High St., Boston 10.

The papers for the three-day gathering are as follows:

WEDNESDAY, OCTOBER 6

"The Role of the Atomic Energy Commission in the Industrial Use of Radioactivity," P. C. Aebersold, director, Isotopes Division, Oak Ridge, Tenn.

"Fundamentals of Radioactivity," W. C. Peacock, technical director, Tracerlab.

"Health Physics Considerations," C. R. Williams, director, industrial hygiene services, Liberty Mutual Insurance Co., Boston.

"Instrumentation for Radioactivity Work," F. H. Low, product manager, Tracerlab.

"Establishing a Radioisotope Laboratory," Edward Shapiro, head, inorganic chemistry department, Tracerlab.

"Isotopes and Labeled Compounds," Seymour Rothchild, head, organic chemistry department, Tracerlab.

"Tasks Ahead for Radioactivity in Industry," George E. Manov, staff specialist in industrial development, Office of the Manager of Research & Industrial Development, Atomic Energy Commission.

THURSDAY, OCTOBER 7

"Gamma Radiation as an Initiator for Polymerization Reactions," D. S. Ballantine, Fission Products Utilization Project, Brookhaven National Laboratory, Upton, L. I., N. Y.

"Polymerization by Various Types of Radiation—A Comparative Study," Gerald Oster, Associate Professor of Polymer Chemistry, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

"A General Survey of Effects of Atomic Radiations on High Polymers," K. H. Sun, physics department, research laboratories, Westinghouse Electric Corp., East Pittsburgh, Pa.

"The Kinetics of Vinyl Acetate Polymerization in Benzene," L. H. Peebles, Jr., Chemstrand Corp., Decatur, Ala.

"The Application of Radioactive Tracer Techniques to Plastics Mold Erosion Study," A. P. Landall, supervisor of technical service, phenolic products engineering section, General Electric Co., Pittsfield, Mass.

"Radioisotope Techniques Applied to Tread Wear Studies," D. L. Loughborough and J. W. Born, physical research laboratory, The B. F. Goodrich Co., Research Center, Brecksville, O.

"The Application of Radioactivity to the Studies of Solvation and Migration Rates of Plasticizers," J. L. Kalinsky, Materials Laboratory, New York Naval Shipyard, Brooklyn.

FRIDAY, OCTOBER 8

"Tracer Measurements of Molecular Migration," S. D. Gehman, head, physics research laboratory, The Goodyear Tire & Rubber Co., Akron, O.

"Penetration of Moisture into Attached Protective Coatings," G. D. Calkins, Meyer Proberskin, V. E. Young, and L. J. Norwacki, Battelle Memorial Institute, Columbus, O.

"Measurement of Liquid Level by Neutron Detection," S. Barnartt and K. H. Sun, physics department, research laboratories, Westinghouse.

"Beta Ray Excited X-Ray Sources for Thickness Gaging," L. Reiffel, supervisor, nuclear physics section, Armour Research Foundation, Chicago, Ill.

"Beta Gaging and Automatic Control," E. T. DePass, project supervisor, Johnson & Johnson, New Brunswick, N. J.

"The Use of a Beta Gage in Continuous Web Thickness Measurement," N. S. Foster, engineering department, Congoleum-Nairn, Inc., Kearny, N. J.

Changes in T. C. Rubber Specifications Announced

News Sheet No. 6 entitled, "Some Improvements in Method of Classification," and Users' Information Circular No. 4 on "Technically Classified Rubber," published by the International Rubber Research Board, London, England, under the date of June, 1954, appeared in the August issue of *Natural Rubber News*, Washington, D. C.

Both of these publications, which are also available separate from the *Natural Rubber News*, deal with changes that have been instituted in the technical classification limits for T. C. Rubber because of complaints received from consumers.

T. C. Rubber has been available in three classifications, "blue," fast curing; "yellow," medium curing; and "red," slow curing rubber, and classification has been defined primarily in strain units,[1] for which certain values have been assigned for each class.

Consumer complaints have indicated that (1) some consignments have contained bales with properties outside the class limits, (2) there has been hesitation in purchasing "blue" rubber because it cured too fast, and (3) there has been reluctance to use "red" because it cured too slow.

It has been determined how misclassification of rubber in any given grade varies with the limits set in strain units; and a producer specification for "yellow" rubber has been set up that does not permit misclassification greater than 10%. Changes in consumer specifications involve overlapping the "red" and "yellow" rubbers on one end and the "yellow" and "blue" rubbers on the other end so that the limits for "yellow" occur at the means for the "red" and the "blue." The mean of the "yellow" is at the upper limit for "blue" and lower limit for "red."

These bulletins also state that another source of misclassification is arising from the variation between laboratory testing results. A worldwide testing network was set up in July, 1951. Monthly check tests were instituted and were originally controlled from the United Kingdom; samples also were sent to laboratories in Europe and to consumers' representatives in the United States. Since January, 1954, with the advent of the new T. C. Rubber classification limits, the responsibility for organizing and controlling this standardization of T. C. Rubber test stations has been transferred to the Rubber Research Institute of Malaya.

Some comments received from consumers in the United States indicate that although the purpose of the change in T. C. Rubber classification limits is desirable, it is unfortunate that a more effective means was not used. The chief cause of misclassification is assumed to be variability among bales of rubber in the same lot, and it is questionable whether or not this assumption is correct. A more likely reason, judging from experience in the United States, is the variability in testing. In addition to the random errors within a laboratory that might be interpreted as variability among bales, there are also systematic testing errors, which may be much more serious than the random errors.

It is suggested that such errors can be detected and eliminated only through the use of a standard sample of natural rubber. Experience in the United States indicates that much less misclassification and confusion would occur through the use of a standard sample than by the system outlined in the IRRB bulletins.

[1]The "strain" is the elongation in millimeters of a 10-cm. test piece under a load of 5 kg./sq.cm. A. C. S. #1 mix cured 40 minutes at 140° C.

Chicago Group Educational Expansion Plans

The Chicago Rubber Group has reported the completion of a highly successful year for its education program. At a dinner-meeting in mid-summer, certificates of completion were awarded to 15 men who for the past year had attended the Group's course in rubber technology at the John Marshall Law School. A complete record of the lectures was compiled by Frank Wilcox, Witco Chemical Co., and distributed to each man as a record of his attendance at the course. Last year's chairman of the educational committee was Bert Vandermar, Acadia Synthetic Products Division of Western Felt Works. The chairman for the 1954-55 period is M. J. O'Connor, O'Connor & Choate, Inc.

Beginning this fall the Chicago Group is planning to offer again the basic course in rubber technology, with the first lecture scheduled for October 5. In addition, a series of six lectures of more advanced nature on compounding for sponge rubber, footwear and tire products, and for roll building is planned.

Eighth National Chemical Exposition Agenda Announced

The agenda for the Eighth National Chemical Exposition to be held in the Chicago Coliseum, October 12-15, has been announced by the Chicago Section of the American Chemical Society, sponsor of the meeting.

Two symposia will be conducted: one by the Manufacturing Chemists' Association on packaging, transportation, and labeling; the other, on exposition marketing by the Chemical Market Research Association. The editors of *Industrial and Chemical Engineering* will present their annual *Industrial and Engineering Chemistry* Lecture, and Walter Reppe, renowned German chemist, will address the Chicago Section.

An estimated 2,000 retail merchandising supervisors will attend a two-day workshop on chemical products in consumer goods organized in cooperation with the State Street Council and the Chicago Association of Retail Merchants. Three exhibits are also planned: Chemical Trail Blazers, relating to new ideas in chemistry; Chem-Phot-Ex, presenting photographs by chemists about chemistry; and an Art Exhibit, putting on display paintings and other artistic works by chemists.

Undergraduate students from the Chicago area will be conducted on tours of the exposition in a program arranged by the National Science Teachers' Association; while college seniors and graduate students will participate in a program entitled "Your Introduction to the Chemical Industry." Finally, the Society of Chemical Industry will give a dinner during which the Chemical Industry Medal will be awarded.

More than 34,000 square feet of balcony and exhibit floor space have been allocated to educational exhibits, J. J. Doheny, exposition manager, announces. Following recent publication of the programs of the Chemical Market Research Association and the Manufacturing Chemists' Association, Mr. Doheny says, inquiries for exhibit space have led to considering the feasibility of making available all main floor space to commercial exhibitors by moving all educational exhibits to the balcony. If additional floor space is made available, booth assignments may be continued until about September 1 or whenever the added room is filled, Mr. Doheny advises.

Tlargi Foundation Open House at USC

Progress in equipping its Rubber Technology Foundation laboratories at the University of Southern California was revealed at an open house held by The Los Angeles Rubber Group, Inc., on July 14 for faculty members and summer students. Equipment already installed included a Banbury mixer, a mill and calender, an extruder, and a Fadeometer, all in the ground-floor laboratory of the engineering building, and curing and testing equipment of the latest design on the second floor. Other apparatus will be installed as soon as it arrives at the Foundation.

Open house was again held August 30 and 31 for representatives of the rubber industry who have not yet seen what is being done at the Foundation. Roy Phelan, of Atlas Sponge Rubber Co., Al Federico, of C. P. Hall Co., and Chet Freude, of Arrowhead Rubber Co., are in charge of arrangements for these gatherings.

Detroit Group Plans Wayne University Rubber Center

The Detroit Rubber & Plastics Group, Inc., is giving consideration to the establishment at Wayne University, Detroit, Mich., of a rubber educational center that will have national recognition. Among the objectives of the Group in this connection are: (1) the development of an undergraduate curriculum in rubber technology and chemical engineering which will give the undergraduate student some knowledge, training, and interest in the field; (2) the creation of courses at the gaduate level to permit advanced training in rubber technology and carry credit toward higher degrees; (3) provision for evening graduate courses for college graduates already working in the rubber industry, with credit toward advanced degrees; (4) to offer, as long as interest remains, non-credit courses to members of the rubber industry who might not qualify for college work.

The Detroit Group reports that courses in practical rubber technology sponsored by the Group in 1953 attracted 253 students and that in the first half of 1954 another 64 men completed these courses. Chairman of the Detroit educational committee in 1953 was V. H. Vodra, then with Wyandotte Chemical Corp. Educational committee chairman in 1954 is E. J. Kvet, Jr., Baldwin Rubber Co. E. W. Tillitson, Wayne University, is coordinating faculty member in this project. Progress has been sufficient to establish a regular instructor for each course.

Detailed information regarding the rubber technology courses sponsored by the Detroit Group may be obtained from H. W. Hoerauf, United States Rubber Co., 6000 E. Jefferson Ave., Detroit 7, Mich.

To Hear Abernathy on Isocyanates

The fall meeting of the Detroit Rubber & Plastics Group, Inc., to be held in Detroit, Mich., October 8, will feature an address on "Isocyanates and Their Reaction Products" by H. H. Abernathy, assistant technical sales manager for the rubber chemicals division of E. I. du Pont de Nemours & Co., Inc. It is expected that the address will be of great interest to both rubber and plastics men in view of the applications to which the isocyanates have been put in recent years.

Rounding out the program will be an after-dinner talk by Nick Kerbawy, business manager of the Detroit Lions Football Team. Mr. Kerbawy will also show films taken of the team in action during 1953.

Wire Symposium for December

The Third Annual Wire & Cable Symposium, jointly sponsored by the Signal Corps Engineering Laboratories, Fort Monmouth, N. J., and the wire and cable industry, will be held December 7-9 at the Berkeley Carteret Hotel, Asbury Park, N. J.

A program is being arranged covering wire and cable materials, their characteristics and uses; wire and cable constructions, with manufacturing and equipment problems; field construction methods; and uses in systems operation.

Further details can be obtained from H. L. Kitts, Coles Signal Laboratory, Fort Monmouth; telephone Eatontown 3-1000, Ext. 81188.

CCDA October 7 and 8 Meeting on Foreign Chemical Industry

The Commercial Chemical Development Association is scheduled to meet on October 7 and 8 at the Bedford Springs Hotel, Bedford, Pa., according to Frank Waldo, general chairman of the conference. The theme of the gathering will be the resurgence of the foreign chemical industry since the outbreak of World War II and the need of American manufacturers to keep abreast of new developments.

Six papers analyzing specific phases of international commercial development will be presented October 7, with the following day given over to a panel discussion of case histories. The Association is not concerned with tariffs or the export and import of goods, Mr. Waldo asserted, but rather with the transfer of technological know-how as a means of maintaining American leadership in the chemical field. License and sale of patents, establishment of foreign operations, and formation of joint companies abroad are on the increase, he added.

Complementary to this general theme, the Association is slated to hold a dinner-meeting on September 12 at the Hotel Statler, New York, N. Y., at which time the commercial development branch of the chemical industry and its effect upon industrial progress will be discussed. Presented in cooperation with the Chemical & Marketing Division of the American Chemical Society, the meeting will be highlighted by the publication of a new book, prepared by members of the CCDA, and tracing the history of the chemical industry in the United States.

Reprints of "Antiozidants for GR-S Rubber" Available

Because of its significance to rubber technologists, reprints of the article entitled, "Antiozidants for GR-S Rubber," by R. F. Shaw, Z. T. Ossefort, and W. J. Touhey, U. S. Army Ordnance Corp., Rock Island Arsenal, Rock Island, Ill., which appeared in our August, 1954, issue, pages 636-42, have been prepared and are available from RUBBER WORLD, at 10¢ a copy. EDITOR.

New York Rubber Golf Group Outing Sees Record Attendance

A morning downpour could not drench the golfing ardor of a record number of New York Rubber Group members and guests who assembled at Baltusrol Golf Club, Springfield, N. J., on August 3. Of the 275 persons in attendance, 215 participated in the golfing program. Vincent J. Lake, of Pioneer Latex & Chemical Co., won the Nesbit Cup with a low gross score of 77. Presentation of the award was made by Jean H. Nesbit, of U. S. Rubber Reclaiming Corp., donor of the cup, and E. B. Curtis, of R. T. Vanderbilt Co., 1953 winner.

Second low gross for members was made by Fil Salamon, of F. F. Salamon Co., with a 78. Four members tied for third low gross: W. B. Curtis, Naugatuck Chemical Division, United States Rubber Co.; H. F. Jones, Jr., H. Frank Jones, Inc.; H. P. Pryor, R. E. Carroll, Inc.; and

(*Continued on page 826*)

NEWS of the MONTH

Washington Report and National News Summary

The unexpected passing of Rep. Paul W. Shafer, of Michigan, on August 17, one of the most influential friends the rubber industry ever had in Congress, came as a shock to the industry. Author of the Rubber Act of 1948, which laid the basis for the Rubber Facilities Disposal Act of 1953, Shafer did more than anyone else not only to establish a workable national rubber policy, but to provide for the eventual minimum of government interference in the industry.

One of the most important pieces of legislative action taken by the 83rd Congress was providing funds for three business censuses, the most important of which will be the Census of Manufactures to be taken in 1955.

Some reduction in GR-S output for September, October, and November has been announced by the Federal Facilities Corp. in view of the uncertainty of demand caused by the closing down of Goodyear and Firestone plants by the strike of the United Rubber Workers of America, CIO.

The Rubber Trade Association of New York in a letter to bidders for the government synthetic rubber plants offers the services of the Association in connection with the marketing of privately produced synthetic rubber, emphasizing the background of many years of experience of its dealer members in marketing all types of rubber.

With the strike of the URWA at the Firestone plants on August 13, 45,000 workers are now idle in the rubber industry. Although negotiations are continuing between the union and the Big Four companies on the question of wages and in some cases working conditions, both sides seem adamant in their positions, and settlement by Labor Day is by no means a foregone conclusion.

Washington Report by Arthur J. Kraft

Industry Loses Most Influential Friend in Congress, Paul Shafer

The rubber industry last month lost its most influential friend in public life with the death on August 17 of Congressman Paul W. Shafer. His death, coming during his eighteenth successive year as a member of Congress, brought an immediate recess in the House and expressions of sadness at his loss from Congressional colleagues and from President Eisenhower.

Mr. Shafer died at Walter Reed hospital here, at the age of 61, following surgery on August 13 for a chronic liver ailment. The passing of the Michigan Republican came only six weeks after the death of his wife, the former Ila P. Mack, of Detroit, at their home in Battle Creek. They were married in 1917, and, until the onset of her last illness, Mrs. Shafer had been a constant source of assistance in sharing the duties of her husband's public career.

In a message of condolence to Mrs. H. Earl Kanaga, of Battle Creek, sister of the late Congressman, President Eisenhower extended his "sincerest sympathy" and praised Mr. Shafer as a "diligent and effective legislator, with a host of friends." Tributes on the floor of the House came from Rep. Jesse P. Wolcott (R., Mich.), House Speaker Joseph W. Martin, Jr. (R., Mass.), former Speaker Sam Rayburn (D., Tex.), and a dozen others. The House approved a resolution for the appointment of a 25-member committee from the House and Senate to attend funeral services August 20 in the Congregational Church at Battle Creek.

Mr. Shafer made his mark in Congress as a member of the former House Military Affairs Committee, which later became the House Armed Services Committee. He was author of legislation which continued government ownership and operation of the synthetic rubber plants after World War II and last year wrote the law providing for disposal of those plants to private industry.

Mr. Shafer earned wide respect and rapt attention for his words and deeds as a framer of this nation's rubber policies. A master of the pungent phrase, he spoke with authority and always from a careful, studious consideration of the facts and after weighing the oft-conflicting views of other workers in the field. He stood alone in Congress as a master of the many-faceted and technical problems in rubber for which the Congress held legislative responsibility.

This position earned for him the sobriquet of "Mr. Rubber" in Congress. In the House, his reputation as an expert on the subject and as a wise counselor often led his colleagues on both sides of the aisle to rely on his views as their cue to legislating national rubber policy. This appreciation of his unique mastery of the rubber field led to an unprecedented tribute to Mr. Shafer last year, when he was unanimously selected as chairman by members of a joint Senate-House conference committee on the rubber disposal bill. Never before in the history of Congress was a member of the House selected chairman of a joint conference committee of the two chambers. The chairman of joint conference committees always had been chosen from among the Senate's conferees.

Mr. Shafer's reputation as a leader in framing this country's rubber policies carried far and wide. Unique recognition of this was shown by the Department of State early last year when it invited Mr. Shafer to attend as a guest of the U. S. delegation, the annual meeting at Copenhagen of the International Rubber Study Group. The natural rubber producing nations of the world were, at the time, restive and uneasy over this government ownership and management of the synthetic rubber industry. Only Mr. Shafer, it was felt, could satisfy their demands for a clear-cut statement of U. S. intentions on disposing of the rubber plants. There is little question that his calm elucidation of America's rubber policies, with a pledge to press for a disposal law on his return to Washington, laid to rest many of their fears that U. S. intentions were inimical to natural rubber producers or at best were clouded with uncertainty.

Shafer's Rubber Act of 1948

Representative Shafer made his first strong impression on this nation's rubber policies as author of the Rubber Act of 1948, the law which set forth as national policy the intention of ultimately removing the government from control over the synthetic rubber industry. The policy statement written into that law, largely as a result of Mr. Shafer's persistence in the face of strong opposition, declared it the purpose of Congress to dispose of the government's war-built synthetic rubber plants at the earliest possible time consistent with the national security.

This law was reenacted at periodic intervals as the Congress, under Democratic control in 1950 and 1952, brushed aside Administration proposals for changes and deferred to Shafer's view that disposal should not be hastened until the national security position in rubber was out of jeopardy. Rejected as a result was the 1950 proposal of an inter-agency committee, headed by Presidential Assistant John R. Steelman, for a start on disposal, subject to rigid restrictions, and coupled with authority for administrative controls on the use of rubber for another decade (until 1960). Mr. Shafer felt that when Congress was satisfied that disposal could be authorized without risk to the nation's security, it should enact a program providing for a clear-cut disposal, completely severing the government from control over the rubber industry. The Congress agreed.

Subsequent months saw the wisdom of this decision borne out as the outbreak of war in Korea found the nation with an inadequate stockpile of natural rubber and with most of the government-owned synthetic rubber producing capacity shut down due to a lack of strong consumer demand for synthetics.

When the Rubber Act of 1948 again came up for review in 1952, Mr. Shafer felt that the post-Korea achievements in building up the strategic stockpile of na-

tural rubber to a war-readiness level and in developing improved synthetics with proven consumer acceptability indicated that the time appeared at hand to implement the declared policy of Congress to dispose of the plants. With the Korean war still unsettled, however, and new Communist threats appearing in Southeast Asia, Mr. Shafer did not press for immediate disposal. The Congress, with his support, agreed to a brief extension of the existing law with new provisions calling upon the Administration to use the interim to develop concrete recommendations for a disposal program.

Shafer's Part in Disposal Act of 1953

With these recommendations in hand, Mr. Shafer headed a House Armed Services subcommittee early last year toward unanimous agreement on a disposal bill. The House overwhelmingly approved the Shafer bill, authorizing a clear-cut disposal program, with sale of the plants to be arranged by a Commission to be named by the President from persons in private life. The sales procedure provided for competitive bidding, with plants going to the highest qualified bidder.

Mr. Shafer felt that this uncomplicated disposal procedure would see the transfer of the $500 million government synthetic rubber industry to private ownership within a year's time or less. He was particularly adamant in rejecting the suggestions of Administration officials that the disposal be handled by existing executive agencies, rather than by an independent Commission of outsiders, and that sales be arrived at through negotiation between government and prospective buyers rather than through the competitive bidding procedure. The Shafer bill also provided for final Congressional approval of the sales program.

The Senate, where aroused Democrats were on the attack against Republican sponsored "giveaways," saw a pitched battle develop over the Shafer bill. After the smoke had cleared, the upper chamber had approved a disposal bill, retaining Mr. Shafer's independent disposal commission, but giving the Congress a wider veto power over sales (the right to veto selectively, rejecting some proposed contracts while accepting others); providing a sales procedure closer to negotiation than to competitive bidding; giving the Attorney General broader responsibility in approving or condemning proposed sales on anti-trust grounds; and providing a disposal period of substantially longer duration.

Mr. Shafer agreed to many of the Senate changes and to modifications of others only with the deepest reluctance and only because to do otherwise would mean no disposal law whatever.

He spoke of his "grave" misgivings about the disposal law a few months later in an address to a chemical industry meeting in Massachusetts. Shafer said he took no pride of authorship in the measure which the Congress enacted, and he predicted that the terms of the bill would hamper and most likely defeat all efforts to sell the plants. But, not long afterward, in a speech to the 1953 annual meeting of The Rubber Manufacturers Association in New York, Mr. Shafer modified this dour forecast by expressing his confidence in the ability of the three disposal commissioners named by the President to overcome the serious built-in deficiencies which he saw in the statute.

It was in this speech that Mr. Shafer hammered home on a theme which he had alluded to only briefly in the past: The primary hope and responsibility for making



Paul W. Shafer

the disposal program a success devolved on members of private industry who want to buy the plants. The responsibility, he said, is a heavy one, but the alternative to a genuine, full-hearted effort by industry was permanent socialization of synthetic rubber production, with all its potential threat of eventually engulfing private consuming firms as well. Success of the disposal program, he reminded the RMA audience, requires that prospective buyers offer prices representing "full, fair value" for the facilities along with a pledge to make synthetic rubber equally available to all consumers, large and small alike.

In a subsequent speech to the House early this year, Mr. Shafer again repeated this warning, and he deplored the loose talk then current indicating that some potential purchasers would just as well see the disposal program fail and therefore were planning to make only a token effort to meet the terms of the disposal law. Mr. Shafer said he was "gravely disturbed" by such talk and warned that a "faint hearted" approach to disposal by private industry would bear bitter fruit.

Intervenes in Latin American Rubber Research Deadlock

Mr. Shafer's role as a prime mover in national rubber policy also was evident when only a few weeks before his death he quietly intervened at the White House to break an inter-agency deadlock which threatened to bring a premature end to this government's natural rubber research program in Latin America. This personal appeal to the President resulted in a quick resolution of the inter-agency difficulties, and a White House pledge to see the program through to its completion.

Rubber Legislation at Minimum in 83rd Congress

National rubber policy issues, which held a spot on the legislative stage in almost every Congressional session over the past dozen years, took a holiday during the second session of the 83rd Congress which closed here last month.

That holiday will be brief enough. For the Number One issue in rubber since the war—disposal of the government-owned synthetic rubber industry—is off in the wings waiting to move front center next winter. The Disposal Commission, set up by Congress 13 months ago to make a try at selling the plants, is due to report back with recommendations in January. Those recommendations and what Congress chooses to do with them will take the spotlight in the following 60 days—the period Congress has set aside to debate and either approve or veto the final disposal plan.

Footwear and Renegotiation

The 83rd Congress, second session, enacted two minor bills dealing directly with rubber. One plugged a loophole in the tariff act, through which a British firm attempted to bring rubber footwear into this country at a lower duty than specified for that item. The other, a provision in the contracts renegotiation law, simply confirmed in statutory language an administrative ruling handed down several months before which dealt with renegotiating contracts for supplies and services furnished to the government's synthetic rubber program.

Tire Bill Pigeonholed

Otherwise rubber legislation had only minor billing in the 83rd Congress. For a brief moment the bill aimed at forcing tire manufacturers, oil companies, and some mass distributors out of the retail tire selling business caused a flutter. Sponsored by the National Federation of Independent Business, this bill came up for public hearings before the Senate Judiciary Committee. But the opposition, coming from tire makers, the Federal Trade Commission, and the Justice Department, was too great, and the bill was quietly placed back in its now-familiar pigeonhole. The tire bill, and its ancestors, have kicked about in Congress for a decade. If the past is any guide, its sponsor, undismayed by repeated cool receptions, will dress up the tire bill for yet another appearance in yet another Congress. The curtain to the legislative stage never truly closes.

1955 Census of Manufactures Approved

A legislative matter in which the rubber manufacturing industry took strong interest was happily resolved later in the session when Congress provided $8,430,000 for three business censuses. These are the Census of Manufactures covering operations of nearly 300,000 manufacturing establishments; the Census of Business, covering about 2,750,000 retail, wholesale, and service establishments; and the Census of Mineral Industries, covering some 35,000 firms engaged in mining, oil production, and quarrying.

The fact-gathering will occupy much of next year, and more money will be needed for the job of subsequently correlating and publishing the collected data, all of them from business records covering 1954 company operations. The Census Bureau has announced that it will mail questionnaires to the three million firms to be canvassed early next year. Already, $1,590,000 has been spent in preparation for the censuses, and the total cost has been estimated by President Eisenhower at more than $13 million.

The largest part of the $8,430,000 appropriation—$5.9 million—was earmarked for the Census of Business. This is to

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[1] Ind
[2] *Ibid.*

bring in data on the number of establishments, sales, employes, and payrolls by kinds of business for each state, county, and place of 2,500 or more population, as well as information on inventories, credits, and other subjects. This census was last taken for 1948.

Congress earmarked $2,130,000 for the Census of Manufactures, to up-date information last collected for 1947. Manufacturing firms will be asked to report on production of commodities, employment, value added by manufacture, consumption of fuel, power, and materials as well as other data. The survey will cover 450 different industries, and statistics will be compiled for states, counties, and cities of 10,000 or more population. This census was taken most recently for 1947.

Strikes Slow GR-S Output

The Federal Facilities Corp. has revised its estimate of September sales of GR-S synthetic rubber to 44,000 long tons. That's a drop of 4,000 tons from the previous estimate made in July for the month of September. Agency officials said the downward revision, although sizable, has "no special significance." It was due, they said, chiefly to overoptimism back in July, tempered in August mostly as a result of labor disputes which had shut down tire and other production at Goodyear and Firestone, two of the largest consumers of GR-S.

This is not to say that those companies are not buying rubber from the government. On the contrary, Goodyear, though shut down since July 9, took delivery on all but 500 tons of the GR-S ordered for July shipment (Goodyear had ordered about 5,000 tons and is warehousing 4,500 tons of this total), although entitled under a clause in its contract with FFC to renege on the total amount while the strike lasts. Firestone, which was struck August 10, had not cancelled any orders, at least up to the time RUBBER WORLD went to press.

In its regular monthly report on estimated sales and output of GR-S, FFC reported August 19 that it plans to hold production at 40,500 tons in each of the next three months, September, October, and November. This plan means dropping an earlier one to boost output in October to 42,200 tons. The decision to hold October to the same level as September was dictated by the uncertainty of the strike situation. Sales are estimated by FFC at 46,000 for October and at 43,000 for November.

The strikes shut down two government-owned plants, both located at Akron and both producing GR-S latex. Some of this production is being made up by increasing latex output at other plants in Los Angeles, Baton Rouge, and Naugatuck.

Sales of GR-S in July amounted to 33,282 tons, falling nearly 5,000 tons short of previous estimates. The July total included 23,179 tons of LTP (cold rubber); 4,568 tons of black masterbatch; 8,363 tons of oil masterbatch; 1,725 tons of oil-black masterbatch; and 2,917 tons of latex. Butyl sales totaled 4,301 tons. August production was set for 38,450 tons of GR-S, including 27,050 tons of LTP; 8,220 tons of black masterbatch; 11,570 tons of oil masterbatch; only 75 tons of oil-black masterbatch (FFC's inventories of this type are overextended); and 3,175 tons of latex. Butyl output is scheduled at 4,800 tons. The above figures for GR-S include rubber plus added oil plasticizer, and, in the case of those masterbatches containing carbon black, the weight of the black also. FFC reported that it held an 82,000-ton GR-S inventory on July 31.

[1] India RUBBER WORLD, May, 1954, p. 246.
[2] *Ibid*, Aug., 1954, p. 680.

Phillips Offering Price for GR-S Only 0.9¢ Higher

In our August issue on page 680 we reported that Phillips Chemical Co., which bid for the Borger, Tex., copolymer and butadiene plants, has been seeking customers for GR-S and promising delivery at 25¢ a pound. We went on to point out that this price was 2¢ a pound higher than the present government selling price, but below the price generally expected of private producers.

In the interest of accuracy we now want to add that the price of GR-S from the government at the present time must include the uniform freight charge of 1.1¢ a pound, making a total cost of 24.1¢ a pound. Therefore the Phillips Chemical proposed price, which includes delivery anywhere in the United States at 25¢ a pound, is only 0.9¢ a pound higher than the present government selling price.

RMA Committee Opposes Recap Standard

At a meeting in Washington on July 21 a special committee representing the Rubber Manufacturers Association Tire Accessories and Repair Materials Committee conferred with representatives of the United States Department of Commerce and the National Association of Independent Tire Dealers concerning the proposed revision of the Department's Commercial Standard CS-108-43 relating to retreading automobile and truck tires.[1]

The special committee emphasized that although camelback manufacturers favor any constructive endeavor to improve the practices of retreaders, they are certain the proposed revision of CS-108-43 will not accomplish this purpose. The proposed standard makes no provision for enforcement or policing, or even for controlling use of the label or medallion it is proposed to utilize for informing the purchasing public that the retread product complies with the government's commercial standard. Adoption of this standard could harm the reputable retreader because his unethical competitor is not effectively prevented from claiming that his poor quality product complies with the government standard and is equal to the genuine high-quality product of the reputable retreader.

The camelback manufacturers' representative pointed out that it is impossible to guarantee high quality through any standard or specification of this sort, detailing requirements for either camelback or repair materials, for reasons obvious to technicians in the industry.

In practical application it is not possible to make shop practice uniform, it was said. In final analysis, the determining factor in the processing of each individual tire is the retreader's skill and "know-how" acquired through experience.

The special committee could see no reason why the government should not duplicate either the existing educational material relating to shop practice, or the expense involved printing and distributing to retreaders throughout the country, in the form of a commercial standard, what would simply be another description of recommended shop practice.

Polhamus Heads USDA Work on Latin America Rubber Research

In connection with the natural rubber research program in Latin America,[2] it was announced by A. H. Moseman, director, Crops Research, U. S. Department of Agriculture, on July 29, that Loren G. Polhamus was to head up the Rubber Crops Section of the Field Crops Research Branch, beginning August 1. The work of the Rubber Crops Section includes studies on potential domestic rubber bearing plants and continuing research on *Hevea* rubber supported by the Foreign Operations Administration in cooperation with Latin American countries.

Mr. Polhamus has been associated with rubber plant investigations for more than 30 years. He conducted cultural and tapping experiments in Haiti from 1924 through 1931 and also conducted detailed experiments with *Hevea* and many other rubber bearing plants in Florida. He assisted with the initiation of research to develop disease-resistant strains of *Hevea* in Costa Rica and Panama and was responsible for the development of plans for the comprehensive surveys on potential rubber production in Latin America prior to World War II (the Latin American rubber research program of today).

National News

RTA Offers Marketing Services for Synthetic Rubber

In a letter dated August 10, R. D. Young, president, Rubber Trade Association of New York, Inc., wrote to the bidders on the government synthetic rubber plants offering the services of his Association in connection with the marketing of privately produced synthetic rubbers, when and if the government plants are sold to industry.

With the transfer of the synthetic plants to private ownership, there is a possibility that in place of the single government selling agency in the past, there will be 15 different sources of supply. While this situation may not present any serious difficulty to a rubber goods manufacturer or group of manufacturers who become synthetic rubber plant owners, it does pose a problem for the hundreds of rubber goods manufacturers who are not participants in the operation of a synthetic plant, with particular emphasis on the group whose consumption requirements fall in the category of less than carload lots, Mr. Young pointed out.

It was further emphasized that in enacting the Rubber Facilities Disposal Act of 1953, the Congress recognize the position of the small synthetic rubber consumer when it was stated: "That the disposal program be designed best to afford small business enterprises and users, other than the purchaser of a facility, the

opportunity to obtain a fair share of the end-products of the facilities sold at fair prices . . . "

The members of the RTA of N. Y. who are classified as "Dealers" are rubber merchants whose function is the buying and the selling of rubber and whose operations include importing, financing, inspection, warehousing, shipping, and the extension of credit to purchasers. Up to the present time, the activity of the dealers has been confined primarily to the merchandising of natural rubber. With the sale of synthetic plants to private enterprise, the functions of the dealers can be expanded if arrangements can be concluded whereby a manufacturer's requirements for both natural and synthetic can be satisfied through one source of supply.

The RTA said it recognized that some large companies who become purchasers of synthetic plants may merchandise surplus material through their own organizations but, on the other hand, it may prove desirable and more economical to utilize existing marketing facilities. Also, some synthetic rubber facilities may be purchased by companies not engaged in the manufacture of rubber products, in which cases it will be necessary to establish a sales organization to merchandise synthetic rubber without being familiar with the consumption requirements of rubber goods manufacturing companies.

In conclusion, Mr. Young pointed out that a large number of dealer organizations are in existence today who are fully equipped in every way to handle the distribution of synthetic rubber on a commercial basis, and who possess a background of many years' experience in the marketing of all types of rubber, which includes, among other things, a knowledge of the individual manufacturer's requirements for both synthetic and natural rubber, with particular reference to the small consumer. These organizations are available to implement the disposal program insofar as the question of the merchandising of synthetic rubber to consumers is concerned, and it is believed that their services can be utilized to excellent advantage by the ultimate purchasers of synthetic rubber facilities.

Firestone Optimistic on Business Outlook

In a statement made during July while observing progress in the construction of his company's guided missile plant in Los Angeles, Calif., Harvey S. Firestone, Jr., chairman of the board, Firestone Tire & Rubber Co., said that fears of any major decline in business have largely disappeared. Economic readjustment has been achieved, and the outlook for the remainder of 1954 is for stable business conditions, he added.

The maintenance of high levels of personal income, consumer spending, and construction activities of all kinds during the past few months were cited as encouraging developments. Most of the industries in the country have corrected unbalanced inventory situations, if they had them.

"Perhaps the most favorable factor in the general picture at the moment is the rebirth of that intangible, but very important element, confidence, that is permeating the business world," Mr. Firestone emphasized.

Beyond the period of reasonable stability during the next few months, the consensus of most business leaders is for a long period of growth and expansion. Three dynamic factors contributing to long-range business optimism were the rapid growth in population, the great need of improvement in our highway system, and the developments in new industries such as atomic power, electronics, aircraft, plastics, and new metals.

The rubber industry is in good condition with demand for its products strong, and inventories in good balance with demand. Demand for tires to service motor vehicles on the road in the farm is expected to be one-third higher in 1960 than in 1954. The demand for products other than tires is expected to grow at the same rate; while the demand for foam rubber should be even greater, it was said.

Although supplies of new natural and synthetic rubber and the demand for total new rubber are in approximate balance at this time, concern regarding a prospective shortage of rubber in relation to the anticipated increase in demand for rubber products was expressed. A substantial expansion in producing facilities for both natural and synthetic rubber will be required to avoid a world rubber shortage in the next five years.

URWA Strikes at Firestone Plants as Goodyear Strike Continues; U. S. Rubber and Goodrich Workers Remain

Negotiations this year between management and labor for wage increases and in some cases working conditions contracts have resulted in a strike at the plants of the Goodyear Tire & Rubber Co., which began on July 8, and a strike at the plants of the Firestone Tire & Rubber Co., on August 13. Workers at the plants of United States Rubber Co. and The B. F. Goodrich Co. have remained at their jobs on a day-to-day basis since the expiration of their respective contracts on July 19 and 26. Companies such as General Tire & Rubber Co. and Seiberling Rubber Co. have recessed their talks with the United Rubber Workers of America, CIO, until a decision becomes evident between the Big Four companies and the union.

Goodrich Offers 5¢ Raise

Goodrich made an offer of a 5¢-an-hour wage increase to the URWA on July 20. A letter to Goodrich employes at about the same time said that the company believed no settlement in excess of 3¢-an-hour was justified in light of uncertain 1954 business conditions, and in view of "pattern" cost of living, benefits, and other considerations. The offer of 5¢-an-hour was made because major competitors had made this excessive offer, Goodrich explained.

A URWA spokesman called the company statement full of distortions and said that the 5¢-an-hour offer was not enough and, therefore, would not be accepted by its members.

The union members voted authority for their officials to call a strike at the plants of the Goodrich Company, but with the expiration of the contract between the company and the union on July 26, no strike was called, and production continued while the negotiators remained at the bargaining table.

Firestone Strike Called August 13

Negotiations between Firestone and the URWA covered both wages and working conditions. On August 7, Firestone offered the URWA a 5¢-an-hour wage increase, but stated that contract changes with regard to working conditions proposed by the union were "wholly unrealistic and impractical."

In a letter to its employes Firestone pointed out that the wages now being paid have advanced beyond increases in the cost of living and "are as good, or better, than those paid in our industry in your area.

"The wage increases and improvements in pensions and insurance granted last year run far in excess of increases granted generally in industry.

"Nevertheless, the company has offered a further wage increase package of 5¢-an-hour."

The URWA in reply emphasized that the union bargaining committee in seven weeks of negotiations had tried to get Firestone to agree to contract changes that would bring the contract up to standards achieved with the company's principal competitors. As examples, the union stated that the piecework system at Firestone was not uniform among the plants or in any one plant, and that a standard work week of 30 hours had been proposed because some of the company's plants were working less than 30 hours and some as much as 56 hours a week.

Authority for the URWA officials to call a strike at all the Firestone plants was voted by union members and with the expiration of the contract on August 11, a strike began midnight the next day, or actually August 13. Negotiations seeking settlement continued, however.

Cardboard Box Tested for Synthetic Rubber Storage

One phase of an experiment to determine whether synthetic rubber stores and ships better in a cardboard box than in the heavy paper bag generally used throughout the industry has been completed by The Firestone Tire & Rubber Co., in conjunction with Federal Facilities Corp.

Eighty thousand pounds of synthetic rubber in 75-pound oblong blocks were placed into the experimental containers last January and shipped by rail from the FFC synthetic rubber plant at Torrance, Calif., to the Firestone plant at Akron, where they have been in storage ever since. With both government and company officials looking on, and a movie camera recording the action for future time-study evaluations, one workman unwrapped the bales for more than an hour.

Object of the experiment was to see whether the synthetic rubber blocks would retain their shape when stored for a long period of time in the cardboard boxes and remain unadhered to the inside of the containers. Efficient and economical unwrapping was also indicated. Final evaluation of the experiment awaits similar tests being held elsewhere.

Government representatives present were E. D. Kelly, director of the Office of Synthetic Rubber, Henry Koehler, Jr., chief of Plant Operations Division of OSR, Alfred W. Anisman, rubber technologist, and Richard J. Jones, field representative of the Technical Service Branch, all of Federal Facilities Corp.

Among Firestone officials present were James W. Maples, manager of tire factories, and J. C. Roberts, director of rubber purchases.



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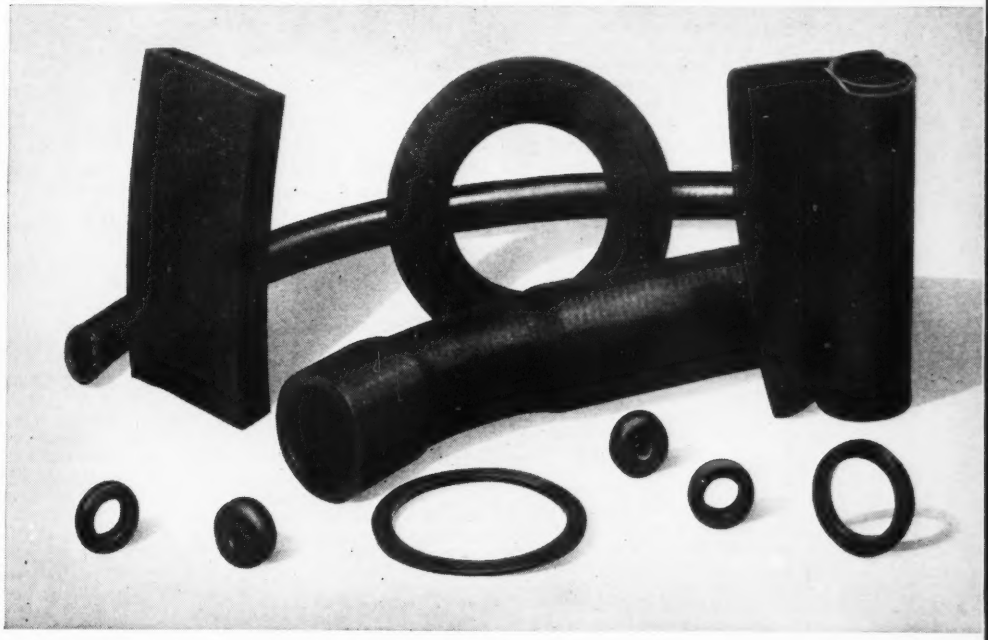


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Other Industry News

Goodyear Unveils Complete Line of Tubeless Tires

A complete line of tubeless tires has been announced by Goodyear Tire & Rubber Co., Akron 16, O. The new tire is said to be based on an entirely new tubeless design, relying on an airtight cord fabric to retain the air, instead of a sealant. Cost of the item is the same as the company's conventional tire and tube combination, and shipments to Goodyear dealers have been taking place since April, making these tires available for 1955-model cars.

Also attributed to the new tire is a 12% greater mileage capacity due to a flatter tread construction. Models are being produced to cover the firm's entire catalog of pneumatic tires, including those for passenger cars, trucks, tractors, airplanes, and wheelbarrows. Truck and bus types, however, are said to be still in the commercial testing stage and may not reach the general market for another year. Designations for the passenger-car designs are given as standard Super-Cushion, nylon Super-Cushion, premium Double Eagle, and winter tread Suburbanite.

Five years of research and $5,000,000 in machinery and equipment went into the tubeless tire, Goodyear states, with the development of a method for prestretching nylon or rayon cord making the design possible. Dubbed 3-T[1], the latter involved a tension, temperature, and time tempering of the synthetic fiber. Prestretching prevents tire growth and carcass separation, the company says, and the process is now being carried out by three huge $1,000,000 machines.

The absence of heavy sealant, present in rival tubeless designs, makes for lower running heat, Goodyear asserts; while the nonporous construction gives puncture protection equal to or better than that of tubeless tires with sealant. Cited also were the tire's advantages over the conventional variety, including less pressure build-up on long trips because of lighter weight and less unsprung weight added to the car, the replacement of sudden blowouts by slow, detectable leaks, and simpler repairs. The tubeless tire can be mounted on standard rims and is held on by the tire's tight-fitting bead, plus internal inflation pressure. The valve in the Goodyear tubeless tire is applied in a locked-in position directly to the rim.

Small punctures can be repaired with the tire either inflated or flat, according to Goodyear. A "Simplug" Repair Kit, supplied for the purpose, provides rubber plugs of assorted sizes, a needle inserting tool, and a special cement. A properly installed plug will last as long as the tire, it is said.

Goodyear reports that in 32,000,000 miles of test driving by a number of large taxicab fleets, the new tire had reduced the incidence of flats by 80%. Other tests have shown that nails and other piercing objects can be left in the tire for as much as 5,000 miles of driving without serious results.

The company has released a photostatic copy of a United States patent for a tubeless tire issued in 1903 to Paul W. Litchfield, then a Goodyear superintendent and now chairman of the board. This release was made amid the current furor in the industry about patent infringement. Goodyear also alleges that as far back as 1895 a tubeless bike tire embodying the open belly design was patented and produced in England, and that other tubeless designs have been revealed over the years.

Its present design, Goodyear says, does not fall back on previous models since it was developed as an airtight container and does not rely upon a single vulnerable liner to hold back the air. The new tire's safety, comfort, and extra value have no precedent among past prototypes, the company adds.

[1] RUBBER WORLD, June, 1954, p. 383.

Carbon Black Producers Form Testing Committee

In an effort to seek a standard system of analytical test procedures for carbon blacks, representatives of carbon black manufacturers held an initial meeting at the offices of Continental Carbon Co., Amarillo, Tex., on July 28. Besides Continental, these included associates of J. M. Huber Corp., Phillips Chemical Co., Columbian Carbon Co., United Carbon Co., Inc., Thermatomic Carbon Co., Sid Richardson Carbon Co., and Godfrey L. Cabot, Inc.

Chairman of the conference was C. A. Carlton, of Huber. J. F. Svetlik, of Phillips, was vice chairman, with A. G. Cobbe, of Cabot, and J. E. Barry, of Continental, secretary and assistant secretary, respectively.

FFC Reveals Changes in Film-Wrapped GR-S Shipping Procedures

Purchasers of GR-S synthetic rubber who wish their shipments wrapped in polyethylene film need no longer enclose with their orders a waiver of rights to claim for damages due to the film-wrapping process, Federal Facilities Corp., Washington 25, D. C., has announced. The installation of additional machines, as well as the fact that the process has passed the experimental point, make this step possible, according to the corporation.

Tackling the serious problem of package adhesion on talced and bagged rubber, particularly in the case of polymers GR-S 1500, 1501, and 1502, FFC also has announced that it is film-wrapping quantities of these polymers and placing them in three-ply paper bags. When so packaged, the polymers will be known as GR-S 1500-F, 1501-F, and 1502-F.

In connection with the use of film-wrapping machines, the FFC reports that the following policy has been adopted:

First, shipments of film-wrapped rubber will be made in large unit containers, when requested, to the extent possible.

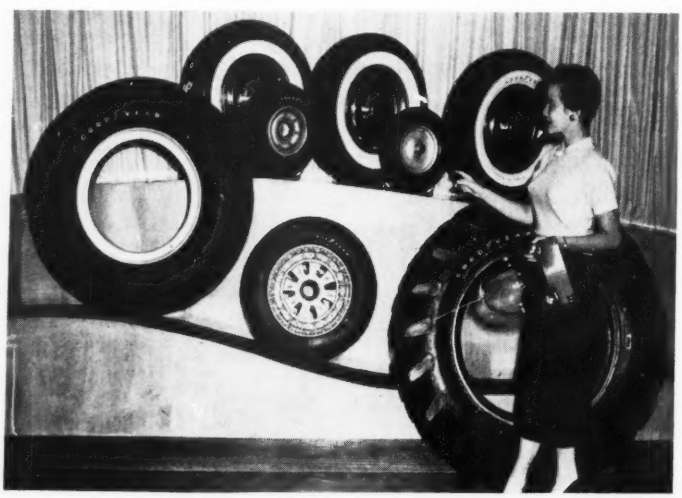
Second, GR-S 1500-F, 1501-F, and 1502-F will be wrapped in polyethylene film and placed in three-ply paper bags for FFC warehouse stocks.

Third, such additional quantities of various polymers as capacity will allow and as are specifically requested by consumers will be wrapped in polyethylene film and placed in paper bags.

GR-S 1500, 1501, and 1502 will be packaged in talc and paper bags for those consumers who cannot use film-wrapped rubber. The film-wrapped types of rubber packaged in large unit containers or bags offer advantages to any company having unit handling equipment and using Banbury mixers to process their rubber. Purchasers are requested to include on their purchase orders the type of package desired. In the case of those requesting the above-mentioned three polymers to be film-wrapped in large unit containers, it shall be assumed that they can also use the F types when it is necessary to rotate them from the FFC inventory.

RC Opens Sales Office

The opening of a plastic film and sheeting sales office at 511 Fifth Ave., New York, N. Y., has been announced by Rubber Corp. of America. General offices and laboratories of the firm are at Hicksville, L. I., N. Y.



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Timken Lowers Space Heater Maintenance Costs

The depositing on various parts of space heaters of heavy coats of both oil and dust has long been an expensive maintenance problem at the Canton, O., plant of The Timken Roller Bearing Co. Removal of the coatings was required three to four times each year at a cost of approximately $75 per heater.

Timken has solved the costly, time-consuming problem by using a permanent impingement-type air filter. Housed in a sheet metal box, two such filters are installed at the back of the heater. Removal and cleaning of the filters are very rapid as compared to the previous slow procedure of dismantling and steam cleaning the heater itself.

Total cost of the sheet metal housing, the filters, and the time required for the installation has been estimated at $125 per heater. The company, with 100 heaters already equipped with the filters, expects to save that amount in only one year through the decreased maintenance costs.

Timken has also installed similar filtering devices in the flues and smoke stacks of its roller hardening department. The potential fire hazard created by deposited carbon particles and oil has thus been eliminated, and another financial saving, again from decreased maintenance costs, is also expected to be realized.

Plax Sells Part of Facilities

Plax Corp., Hartford, Conn., has sold its entire productions equipment and patents for the manufacture of extruding rods and tubes of methacrylate, polyethylene, polystyrene, and fluorocarbon, and for the molding of heavy-gage sheets of polyethylene and polystyrene and gages of fluorocarbon. The recipient of the transaction, Westlake Plastics Co., Lenni Mills, Pa., will also receive a large stock of finished products, patents controlling the Lubo-Film process for extruding rods and tubes, and patents relating to the Liquo-Temp process for annealing all products.

Plax, a subsidiary of Emhart Mfg. Co., Hartford, will use the factory space provided by the deal to expand its "squeeze-bottle" and extruded film and oriented sheet businesses.

Dow Sponsors New TV Show

Sponsorship of a television series dramatizing factual medical case histories has been announced by Dow Chemical Co., Midland, Mich. Titled "Medic," the series, scheduled to begin September 13, will be filmed in hospitals, clinics, and doctors' offices. It has the official endorsement of the Los Angeles County Medical Association, the first such endorsement ever granted by a branch of the American medical profession.

Kaolin Interest Up

Increasing interest in Bell Kaolin, a low residue white casting clay used in the rubber industry, is reported by John McLaren, sales manager of Bell Clay Co., Gleason, Tenn. Other applications for the product have been found in the ceramic and insecticide industries.

U. S. Rubber Halts Tube Production at Eau Claire

The United States Rubber Co. will discontinue production of tubes at its tire plant at Eau Claire, Wis., as part of a cutback necessitated by its rising output of tubeless tires, the company announces. To be operative on September 1, the move will affect 25 employes, or 7% of the plant's total working force. Eau Claire produces rubber for retreading tires and also automobile, truck, and farm tires.

Southern Sales Agent for Gen-Tac Latex

Southern Latex Corp., Austell, Ga., has become southern sales for Gen-Tac latex, the special cord dip latex made by The General Tire & Rubber Co., Akron, O. The product will be distributed in Georgia, Florida, Alabama, Mississippi, Tennessee, and North and South Carolina. Southern Latex is a manufacturer of fully compounded latex preparations and distributes various other latices.

Tubeless Tire Production

The B. F. Goodrich Co., Akron, O., has tire plants in five states which are prepared to supply tubeless units for new automobiles should car manufacturers adopt such tires as standard equipment, according to a recent announcement from the company. In addition, an increase in the production capacity of plants making the tires is planned with the allocation of "a substantial portion" of the firm's $30 million plant expansion and improvement program for this purpose.

Cabot Office Head Announced

The newly established Chicago office of Godfrey L. Cabot Co., Boston chemical manufacturing firm, will be headed by Francis H. H. Browning, it has recently been announced. The office will service the Illinois, Minnesota, and Wisconsin areas. Cabot products include carbon blacks, pine-tar derivatives, Wollastonite, Cab-o-sil, kaolin, and plastics chemicals.

Goodrich Soft Heel

An "extra soft" heel for women's shoes has been introduced by the shoe products sales division of The B. F. Goodrich Co., Akron, O. Similar in design and purpose to the company's heel for men's shoes already in use, the heel is reported to be made of special rubber, light in weight, and long lasting.

Republic Distributor Named

The Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, O., has appointed W. H. Summers Co., Cleveland, O., distributor of its hose, belting, and packing in the Cleveland and northern Ohio areas.

Eagle-Picher Purchases Fabricon Products, Inc.

Purchase of almost all of the common stock of Fabricon Products, Inc., has been announced by The Eagle-Picher Co., 1100 American Bldg., Cincinnati 1, O.; $9,780,738 was paid for 296,386 shares, amounting to 98.8% of the total common stock. The stock was acquired through the exercise of options and by deposits made in acceptance of Eagle-Picher's offer of $33 a share. Fabricon Products has no funded debt or preferred stock.

The deal will not result in an increase in Eagle-Picher's capitalization, it was reported. The firm, however, has replaced its $15,000,000 3¾% notes maturing serially to September 1, 1972, with a similar loan maturing serially to July 15, 1974. Under the new loan serial, maturities of $1,000,000 fall due on each July 15 starting in 1960.

Founded in 1920, Fabricon Products manufactures foundation panels and other fiber products for the automotive industry, waxed paper and cellophane wrappers for the food industry, and plastic products. Two of its plants are located at River Rouge, and one each at Bridgeport, Philadelphia, Pittsburgh, and Los Angeles. Its net profit for the fiscal year ended November 30, 1953, amounted to $1,218,000.

Hycar Wheel Bearing Seals

Seals for the front-wheel bearings of International Harvester's line of small trucks are now being made of Hycar American rubber by the Victor Mfg. & Gasket Co., Chicago, Ill. Named Type K-4, the seals are double-lip units molded to an L channel and mounted behind the bearings, where they form complete seals between the wheel drums and the spindles for the purpose of preventing grease from escaping and foreign materials from entering the bearing cavities.

The seals are necessarily molded to close tolerances and are reported to maintain their tight seal under severe operating conditions and over a wide range of temperatures. In addition, the chemical resistance of the synthetic rubber makes the units impervious to grease and oil, according to the company.

Name Two H-P-M Distributors

The Hydraulic Press Mfg. Co., Mount Gilead, O., has announced two new distributors for its products. They are Mine & Smelter Supply Co., Denver, Colo., and El Paso, Tex.; and Todd Machinery Co., Salt Lake City, Utah. H-P-M produces hydraulic presses for the metal working and process industries, die casting machines, plastics injection molding machines, plastics compression and transfer molding presses, hydraulic pumps and motors, cylinders, valves, power units, and hydraulic circuit accessories.

C. P. Hall Appointed Sales Agent

The Trendex Division of Humko Co., Memphis, Tenn., has given the exclusive right to sell its fatty acids for the rubber industries to C. P. Hall Co., Chicago, Ill., who will service the products in the areas now covered by its sales force.



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U. S. Rubber New Research Center Details

A new $4,000,000 research center will be built by United States Rubber Co., Rockefeller Center, New York 20, N. Y., the firm announces. To occupy a 90-acre site in Preakness, Wayne Township, N. J., the center will be devoted to research and development in the fields of rubber, chemicals, textiles, and plastics and will employ 400 persons. Work on the project will begin in the fall of this year, and occupancy is expected to take place early in 1956.

The center will consist of a main laboratory with 90,500 square feet of floor space, an experimental laboratory of 35,000 square feet, and a chemical engineering laboratory of 8,500 square feet. As will be seen from the accompanying illustration, the architecture and arrangement of the buildings will suggest a university campus in appearance.

The company's present research facilities are in Passaic, N. J.

Cyanamid Names Petrochemical Sales Force

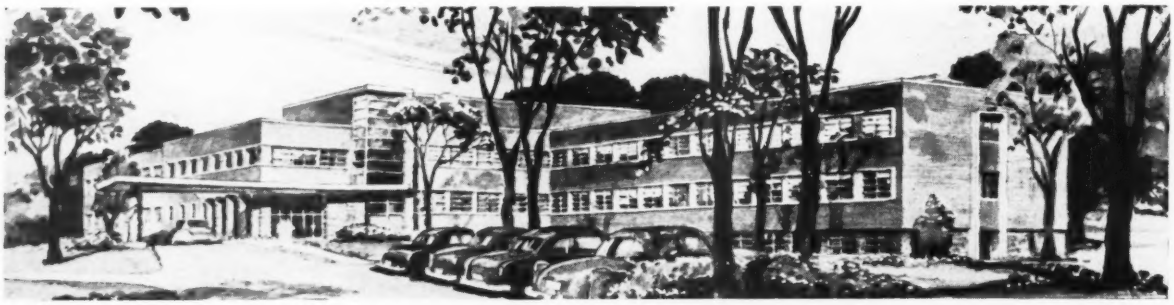
Organization of a petrochemicals department sales unit to handle most products of its Fortier plant in New Orleans has been announced by American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. The group will be headed by V. E. Wellman, currently manager of the petrochemicals department, who will deal with sales and sales development of acrylonitrile and other chemicals. Also named were A. J. Weith as assistant sales manager, George C. Voss as New York district sales manager, and Frank W. Miner as Chicago district sales manager.

J. C. Pullman will become manager of technical service of the petrochemicals department, it was also reported, participating in the commercial development of acrylonitrile and its derivatives and supervising all departmental technical matters pertaining to sales. He has been with the company since 1943, when he joined its research laboratories at Stamford, Conn.

Du Pont to Build Film Laboratory

A $1,000,000 sales development and technical service laboratory for its film department will be built by E. I. du Pont de Nemours & Co., Inc., on its Chestnut Run property on Center Road, Wilmington, Del. To be completed by the end of 1955, the laboratory will seek new applications for the company's cellophane, acetate, and polyethylene films, "Mylar" polyester film, cellulose sponges and sponge yarn, cellulose bands, and other film products.

The one-story steel and masonry structure will be 147 by 175 feet and have 25,725 square feet of floor space. The facilities will include six temperature and humidity controlled rooms and laboratories for package testing and for development of packaging machinery and equipment, investigation of problems of printing and package design, testing of electrical properties of materials, and exploration of new uses and methods of application of film products.



Proposed Plan of United States Rubber Co.'s New $4,000,000 Research Center at Preakness, N. J.

Partly Machined Nozzles Stocked by IMS

Maintenance of the world's largest stock of partly machined nozzle blanks for all makes and models of injection machines is claimed by The Injection Molders Supply Co., 3514 Lee Road, Cleveland 20, O. This is done, the company says, to accommodate the increased demand for heated nozzles with new tooling to allow shorter quick-setting sprues in injection molding, resulting in savings of cycle time and grinding costs.

Shipment now averages 2-3 days from receipt of order, the firm reports. It also maintains stocks of heater bands, thermocouples, and controllers for heated nozzle extensions, such as, nylon, acetate, and other long-nozzle types.

Methylbenzyl Ether Available in Tank-Car Units

Methylbenzyl ether (bis-alpha-methylbenzyl ether), a softener and tackifying agent for nitrile rubber, is now available in tank-car quantities, according to its producers, Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

The company reports that the chemical structure of the compound indicates high solvent power for synthetic resins at elevated temperatures and possible use as a plasticizer or plasticizer extender. The material also may prove to be of value as a solvent in countercurrent extractions of antibiotics and other pharmaceuticals.

Schoonover, Bekkedahl, Appel Move Up at NBS

Irl C. Schoonover was appointed chief of the mineral products division of the National Bureau of Standards, Washington, D. C., succeeding Herbert Insley, who has retired. Norman Bekkedahl will assume the position of chief of the polymer structure section left vacant by Dr. Schoonover. Also announced was the appointment of William D. Appel as assistant chief of the organic and fibrous materials division.

Dr. Schoonover has a wide background in the investigation of refractory materials, plastic properties, and the physical concepts of solids and was at one time chief of the dental materials section of the National Bureau of Standards; he also engaged in wartime atomic weapon research at Los Alamos.

Dr. Bekkedahl, the author of more than 40 published papers, originated the application of thermodynamics to the chemistry of rubber and the application of dilatometry to the study of transitions in rubber and received the Department of Commerce Silver Medal in 1954 for his contributions to science and technology in the field of rubber chemistry.

Mr. Appel, the recent recipient of the American Association of Textile Chemists & Colorists' Olney Medal, has done extensive research in his chosen field, including investigations on the spectral transmission of dye solutions and the reflecting properties of dyed materials in relation to their physical constitution; the color-fastness of various dyed materials; the physical, chemical, and biological properties of textile fabrics and products; and many textile testing methods.

G-E Makes Silicone Rubber Nipples

Nipples made of G-E silicone rubber and reported capable of resisting prolonged steam sterilizations have been announced by the chemical division of General Electric Co., Pittsfield, Mass. Other advantages cited for the new products are the absence of an unpleasant rubbery taste, a retentive and clogless feeding hole, and ability to withstand the softening effects of formulae.

The nipples are expected to be priced somewhat higher than conventional varieties and will not be available for general use until current tests are completed. Two companies now manufacturing the product are Davol Rubber Co., Providence, R.I., and Pyramid Rubber Co., Ravenna, O.

Du Pont "Adiprene" B Being Tested

"Adiprene" B urethane, an experimental rubber believed to possess excellent abrasion resistance, which has displayed high tensile strength and resistance to oxygen and ozone degradation, has reached the field testing stage, according to its developer, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. This new rubber is of the isocyanate type, and du Pont holds a number of basic patents in this field.

The new material is at present difficult to process, the company reports, and samples for industrial research will not be made available until further tests prove its theoretical value.

LESS THAN .0002" VARIATION IN PLASTIC GAGE

...with calender rolls on TIMKEN® precision bearings

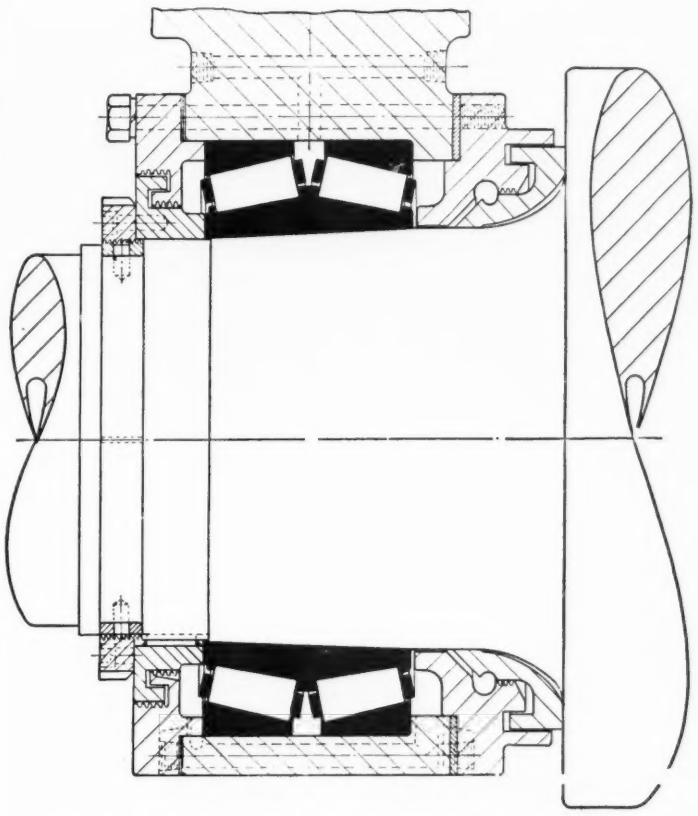


Diagram shows how calender rolls are mounted on Timken precision bearings to maintain uniform gage of plastic and rubber sheeting.

GAGE of plastic sheeting can be held 40 times closer when you mount calender rolls on Timken® tapered roller bearings instead of old-type sleeve bearings! With Timken precision bearings, gage can only vary plus or minus .0002", while variation with sleeve-type bearings can total as much as .008".

By holding gage to minimum tolerances, Timken bearings increase yield. You get more yards per pound of material. And these closer tolerances also reduce scrap loss where you imprint on sheeting.

Because the tight fit between the neck and the inner race of the Timken precision bearing eliminates roll neck wear, roll necks do not require re-machining. Down-time is minimized!

The tapered construction of Timken bearings lets them take radial and thrust loads in any combination. Line contact between the rollers and races gives extra load-carrying capacity. And Timken precision bearings are made of the finest steel ever developed for bearings—Timken fine alloy steel. The only way we can get steel good enough for Timken bearings is to make our own. No other U. S. bearing manufacturer does it.

Approximately forty calender stands are now on Timken bearings with bearing sizes ranging from 10 inches to 29 inches O.D. Get all the advantages of Timken tapered roller bearings in your calenders, mills, refiners and mixers. For complete information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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BEARING TAKES RADIAL ↓ AND THRUST → LOADS OR ANY COMBINATION

United Carbon Tries Collapsible Containers, Expands Facilities

Trial orders of furnace black packaged and shipped in collapsible rubber-fabric containers are currently being filled by United Carbon Co., Inc., Charleston, W. Va., to permit evaluation of this type of handling by customers. Only three such containers, each with a capacity of approximately five tons, have been acquired by United up to the present time, however, in view of the fact that the company is not now equipped to handle the units. If the potential savings from such containers can be realized, the carbon black supplier will have to install a substantial amount of equipment and perform extensive alterations on its plants to turn out volume shipments in the collapsible bags.

Similar containers manufactured by Firestone Tire & Rubber Co. have been successfully used by Godfrey L. Cabot Co. to ship carbon black from Louisiana to Akron, O. (See our August issue, page 685.) Also, United States Rubber Co. has announced the development of collapsible rubber-fabric bags for application to the same type of materials. (See page 847 for a description of the U. S. Rubber product.)

United Carbon has also announced the modification and expansion of several of its facilities. The first stage of such a program was completed on June 1 at the Ryus, Kan., plant, and that installation is now in volume production of ISAF furnace black of the "70" type. Increased production of furnace blacks, particularly of the ISAF type, is also the object of an expansion program at the Aransas Pass, Tex., facility, with large-scale production scheduled to flow from this plant by September.

The Charleston research laboratory of the company is also being substantially enlarged by the addition of new equipment and the relocation of the working area. Intended to complement the general research lab at Borger, Tex., this facility will investigate sales service problems, development work, and general use of carbon blacks in rubber, plastics, inks, etc. The work will be performed under the direction of I. Drogin, who will be assisted by A. G. Susie and a staff of experienced technicians.

Progress of New Guided Missile Plant Observed

Progress in the construction of The Firestone Tire & Rubber Co.'s new $2,000,000 guided missile plant in Los Angeles, Calif., was observed recently by Harvey S. Firestone, Jr., chairman of the firm. To contain 350,000 square feet of floor space, the plant will adjoin the company's main tire factory and will augment present facilities manufacturing the Corporal, the Army's most advanced guided missile.

"Our nation's guided missile program is an important undertaking, vital to the defense of the country," Mr. Firestone commented. "We are glad to be a part of it by devoting our scientific and manufacturing facilities to the program."

Capable of carrying either atomic or high-explosive warheads, the Corporal is an electronically directed missile, fired vertically from a mobile launcher to selected targets far beyond the range of present 280-mm. atomic cannon.

Columbia-Southern Builds New Laboratories

Contracts for the construction of two laboratory buildings at Natrium, W. Va., have been awarded by Columbia-Southern Chemical Corp., 1 Gateway Center, Pittsburgh 22, Pa. Control and research work will be the principal functions of the larger of the two structures, which will contain more than 35,000 square feet of floor space and be completed about June, 1955. Development and pilot-plant operations will be centered in the smaller building, to be finished about December, 1954, and having 8,400 square feet of floor space.

Columbia-Southern's plant at Natrium produces chlorine, caustic soda, and related chemical products.

Atlas Natural Rubber Sheet Linings

The Atlas Mineral Products Co., of Mertztown, Pa., and Houston, Tex., has added natural rubber sheet linings to supplement its neoprene, Saran, polyethylene, and plasticized polyvinyl chloride sheet and tank linings. The company's trained crews apply the linings in the field.

Plans Continental Expansion

Continental Machinery Co., Inc., 261 Broadway, New York 7, N. Y., will shortly launch a substantial expansion of its integrated services to the rubber, plastics, and chemical industries, according to H. Walter Grote, newly elected president of the 35-year-old concern. Services to both large and small factories will include furnishing of machinery and equipment,



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H. Walter Grote, President, Continental Machinery Co.

process engineering, construction supervision, training of operators, and delineating of raw material sources, Mr. Grote reports.

New Aniline Compounds Available in Bulk from Carbide

Two new commercial chemicals, N-butyl aniline and N-2-ethylhexyl aniline, are now being offered in drum quantities by Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. The company reports that these substances are superior to the comparable aniline and lower N-alkyl anilines, having higher boiling points, lower water solubilities, lower vapor pressures, lower toxicities, and higher solubilities in oil or hydrocarbons.

N-butyl aniline and N-2-ethylhexyl aniline are applicable in processes requiring N-alkyl anilines in the production of dyes and pigments, the company says, as well as the manufacture of surface-active agents, flotation reagents, explosives and propellant stabilizers, gum and corrosion inhibitors, oil and gasoline additives, rubber chemicals, resins and plastics, textile processing chemicals, insecticides, varnishes, and coatings.

Whitehead Distributing Geon Pipe and Fittings

Pipe and fittings fabricated from B. F. Goodrich Chemical Co.'s Geon polyvinyl plastic are now being distributed by Whitehead Metal Products Co., New York, N. Y. Produced by Alpha Plastics, Inc., West Orange, N. J., the pipe comes in sizes from ½-4 inches, and the molded fittings in ½ to two-inch sizes, threaded or sleeved, in tees, 45-degree or 90-degree elbows, blind flanges, nipples, plugs, companion flanges, couplings, and caps. Valves are also available, and larger fittings can be made on order.

Geon plastic is unaffected by alkalies, acids, salts, oxidizing agents, oils, greases, alcohols, gasoline, or carbon tetrachloride, Whitehead reports, and the pipe and fittings can be used in the chemical, food processing, gas transmission, and marine industries.



Guided Missile Plant Being Built by Firestone at Los Angeles





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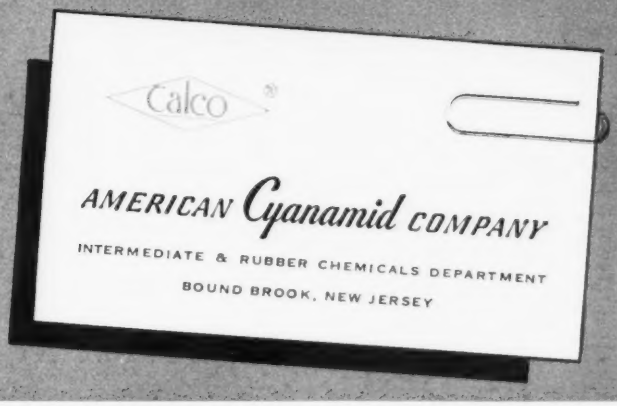
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H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

Sinclair Building Marcus Hook Petrochemicals Plant

Construction of a petrochemicals producing plant at its Marcus Hook, Pa., refinery has begun, announces Sinclair Chemicals, Inc., subsidiary of Sinclair Oil Corp. An annual production quota of 18,000,000 gallons of pure aromatic hydrocarbons, including toluene, xylenes, and paraxylenes, has been set. These will be supplied to the chemical and allied industries manufacturing plastics, synthetic fibers, paints, medicinals, and other chemical products.

Universal Oil Products Co. will allow the use of a Udex unit for processing 2,300 barrels daily of selected catalytic gasoline fractions. The unit will be built by Badger Mfg. Co., Boston, Mass., which will also construct an installation to produce 10,000,000 pounds annually of paraxylene, a synthetic-fiber raw material.

The feed stock for Sinclair's entire petrochemical operation will be secured from its new catalytic reforming unit now being completed at Marcus Hook.

Reinforced Plastic Truck Body Made by Lunn Laminates, Inc.

Production of the first package delivery truck body ever molded out of reinforced plastics was announced by James S. Lunn, president, and Harry T. Douglas, vice president, of Lunn Laminates, Inc., before the recent meeting of the Metropolitan Section of the Society of Automotive Engineers, at the Brass Rail Restaurant, New York, N. Y.

Prototype of a series expected to be ordered by United Parcel Service, one of the largest package delivery service organizations in the country, the truck body is constructed of polyester resin impregnated with glass fiber, lustrous brown in color, and mounted on a one-ton Ford chassis.

The truck body weighs only 650 pounds, it was revealed, little more than a third as heavy as comparative aluminum-steel types, and considerable reduction of maintenance costs in terms of gasoline consumption and tire life is therefore expected. In addition, savings in physical upkeep through the inherent qualities of reinforced plastic are anticipated: namely, imperviousness to rusting and corrosion, resistance to weather, impossibility of peeling or warping, and the fact that colorants are an essential part of the material.

Mr. Douglas stressed his faith in the commercial feasibility of these fiber-glass reinforced plastic truck bodies, estimating the range of annual production at between 1,000 and 2,000. Coupled with the freedom of design and comparative ease of design changes, he said, plastic tools are indicated for such quantities; the amortization of tooling over this limited number of parts more than compensates for the higher per pound price of the impregnated plastic when compared to the per pound price of steel or aluminum. The UPS prototype, he added, will be rigorously tested, and several vacuum bag molded pilot-plant models delivered to extend the scope of these tests.

Eagle-Picher Buys Zinc Properties

The Eagle-Picher Co., 1100 American Bldg., Cincinnati 1, O., has announced the purchase from Calumet & Hecla, Inc., of zinc properties in the Wisconsin-Illinois field consisting of leaseholds on approximately 3,650 acres of land and including a mill, supplies, and materials. This more than doubles the company's zinc ore reserves in this area.

Other recent purchases of the company have included the mining properties and equipment of Bilharz Mining Co. and the Gordon mine of American Smelting & Refining Co. Besides the Wisconsin-Illinois field, Eagle-Picher now has mining operations in Missouri, Kansas, Oklahoma, and Mexico.

U. S. Rubber Enlarges Winnsboro Plant

Completion of its half-million dollar program to expand and modernize its Winnsboro, S. C., textile plant has been announced by United States Rubber Co., Rockefeller Center, New York, N. Y. Annual production capacity of the plant is now estimated at 3,250,000 pounds of synthetic yarns and blends.



New United Parcel Service Delivery Truck with Glass-Fiber Impregnated Polyester Resin Body Made by Lunn Laminates, Inc.



Giant U. S. Tire for Earth-Movers

2,600-Pound Tires for Earth-Movers

Tires that weigh 2,600 pounds and stand eight feet high are currently being manufactured by the United States Rubber Co. at its Detroit, Mich., plant. The units, said to be the largest series ever turned out by the company, are intended for use on earth-moving and strip mining equipment, bottom dump trucks, and self-loading scrapers.

Named the U. S. Royal Con-Trak-Tors, the nylon tires are 30.00-33 in size and have a 40-ply rating. The tread, of full lug design, is nearly 3½ inches thick. About two miles of bead wire and enough nylon to make 3,000 pairs of women's stockings are used in each unit, according to the company.

Curing time for the Con-Trak-Tor is about 16 hours, as compared to approximately 17 minutes for a typical first-grade passenger-car tire.

Goodyear Redeeming $5 Preferred Stock September 30

Directors of The Goodyear Tire & Rubber Co., Akron, O., on August 16, voted to call for redemption on September 30, 1954, all outstanding shares of the company's $5 preferred stock at the redemption price of $105 a share.

With 564,649 shares outstanding, the transaction will involve a total payment of $59,288,145, to be made out of the company's working funds.

In making this announcement, P. W. Litchfield, chairman of the board, said that Goodyear's financial position made it possible to redeem at this time out of working funds the entire issue of senior stock which has been outstanding since 1936.

Payment of the full redemption price will be made on and after September 30 to shareholders surrendering their certificates to the redemption agent, The Hanover Bank of New York. Payment of the regular third-quarter dividend of $1.25 a share on the preferred stock will be made on September 15 and covers all dividends accrued to the redemption date, September 30.

C. L. Kenny has been named works manager in charge of all factory and production facilities at Pioneer Rubber Mills, San Francisco, Calif. He was formely associated with Quaker Rubber Corp.



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Campbell SOAPSTONE DISPENSER



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Dow Builds New Biochem Labs

Construction has begun on its new biochemical research building, Dow Chemical Co., Midland, Mich., has announced. The 208- by 190-foot structure will provide 40,000 square feet of laboratory space for the toxicology, industrial hygiene, microbiology, basic biochemical, and wood departments and should be completed within a year.

Dow's biochemical research department was founded in 1933 by D. D. Irish, who still directs its activities. New Dow products undergo biochemical investigation, as do older materials, where their entry into new fields of application indicates need of additional knowledge, the company reports.

Polymekon Wax Available

The commercial availability of Polymekon Wax, a newly developed chemical modification of microcrystalline wax, has been announced by Warwick Wax Co., Inc., subsidiary of Sun Chemical Corp., Long Island City, N. Y. The wax is being produced at the recently expanded Chanute, Kan., refinery of the company.

The outstanding characteristic claimed for Polymekon is its unusual ability to form films. Because of this, it is being recommended for use as an additive in the manufacture of rubber compositions, electrical insulating compounds, etc.

Derived from petroleum, the new wax is the result of further chemical processing of the refinery fraction of a blend of microcrystalline waxes with polyethylene.

Gates Plans Expansion

Plans to build a warehouse and manufacturing addition to its plant at a cost of $1,000,000 have been announced by Gates Rubber Co., Denver, Colo. The new two-floor reinforced concrete unit will provide an added 216,000 square feet of floor space to the firm's present facilities. Work will be completed by April, 1955, the company says.

Canadian Agent for Vacuum Forming Corp.

Vacuum Forming Corp., Port Washington, N. Y., has appointed a new Canadian sales representative to handle its line of vacuum-forming and drape-forming equipment. The agent is the F. F. Barber Machinery Division of Massey-Harris-Ferguson, Ltd., with offices at 187-191 Fleet St. W., Toronto, and branches in Montreal, Windsor, Hamilton, and Vancouver.

Vacuum Forming manufactures the Model 50-20 and other machines for automatic fabrication of containers, three-dimensional displays, light diffusion panels, trays, appliance parts, toys, novelties, instrument panels, and other consumer products and industrial parts from plastic films and sheets.

Robert D. Stewart and **Sebern G. Sellers** have joined the fine chemicals sales group of Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.

CALENDAR

Sept. 23. Southern Ohio Rubber Group. Fall Technical Meeting. The Engineer's Club of Dayton, Dayton, O.
Sept. 25. Connecticut Rubber Group. Annual Outing. Grassy Hill Park, Sodom Lane, Derby, Conn.
Sept. 30. Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Oct. 5. The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Buffalo Rubber Group. Westbrook Hotel, Buffalo, N. Y.
Material Handling Institute, "Traveling Clinics." Hotel Sheraton-Plaza, Boston, Mass.
Oct. 6. Hotel Syracuse, Syracuse, N. Y.
Oct. 6-8. Symposium on Applications of Radioactivity in the Rubber and Plastics Industries, Tracerlab, Inc., Boston, Mass.
Oct. 7. Miami Valley Section, SPE.
Oct. 8. Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.
Oct. 12-15. National Chemical Exposition. Chicago Section, A. C. S. Chicago, Ill.
Oct. 13. Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct. 14. Northern California Rubber Group.
Oct. 15. Boston Rubber Group.
Oct. 20. New York Section, SPE. Hotel Gotham, New York, N. Y.
Washington Rubber Group.
Oct. 22. New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Nov. 3. The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Nov. 3-5. Society of Rheology. Annual Meeting. National Bureau of Standards, Washington, D. C.
Nov. 10. New York Section and Newark Section, SPE. Joint Meeting. Hotel Gotham, New York, N. Y.
Nov. 11. Northern California Rubber Group. Miami Valley Section, SPE.
Nov. 15-17. ASTM Committee D-20, Plastics. Hotel Carter, Cleveland, O.
Nov. 17. Washington Rubber Group.
Nov. 17-19. ASTM Committee 9, Electrical Insulating Materials. Hotel Carter, Cleveland, O.
Nov. 18. Rhode Island Rubber Club. Metacomet Golf Club, East Providence, R. I.
Dec. 2. Fort Wayne Rubber and Plastics Group.
Dec. 4. Miami Valley Section, SPE. Christmas Party. Hartwell Country Club.
Dec. 7-9. Third Annual Wire & Cable Symposium. Berkeley Carteret Hotel, Asbury Park, N. J.
Dec. 8. Buffalo Rubber Group. Christmas Party. Buffalo Trap & Field Club, Williamsville, N. Y.
Dec. 9. Northern California Rubber Group.
Dec. 10. Detroit Rubber & Plastics Group, Inc. Christmas Party. Sheraton Cadillac Hotel, Detroit, Mich.
New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y.
Boston Rubber Group. Christmas Party.
Dec. 17. Chicago Rubber Group. Christmas Party. Morrison Hotel, Chicago, Ill.
Dec. 18. Southern Ohio Rubber Group. Christmas Party.

S & G Rubber Co. has announced its intention of building an addition to its plant at El Monte, Calif., on property adjacent to its Record Biscuits Co.

MHI to Convene October 5 and 6

The Material Handling Institute will continue its series of "traveling clinics," convening at the Hotel Sheraton-Plaza, Boston, Mass., October 5, and at the Hotel Syracuse, Syracuse, N. Y., October 6. In these, its fourth and fifth such assemblage, the Institute will furnish five panels consisting of five specialists selected from the headquarter staffs of its member companies. The announced agenda of discussions follow: receiving and shipping; handling in old and multi-story buildings; storage, warehousing and yard-handling; how to select an industrial truck—purchase or lease?; how to get started in material handling.

General Chemical's Lab Moves

General Chemical Research Laboratory, Allied Chemical & Dye Corp., General Chemical Division, has announced that it has transferred its facilities from Laurel Hill, Long Island City, N. Y., to Morristown, N. J. All communications should be addressed to P. O. Box 405, Morristown, N. J.

New York Group Outing

(*Continued from page 808*)

A. W. Hubbard, Standard Oil Development Co.

A score of 34 won the putting contest for Ed Tyne, of Irvington Varnish & Insulator Co. Most honest man on the green that day was generally admitted to be Len Komar, of Titanium Pigment Co., who confessed to having rolled up 155 strokes during the afternoon's activities.

Jerry Provost, of U. S. Rubber, headed the committee in charge of arrangements.

Chicago Group Has Most Successful Outing

A record turnout of 300 attended the golf outing of the Chicago Rubber Group at St. Andrews Golf Club, West Chicago, Ill., on July 23. Golf and door prizes contributed by more than 150 raw material suppliers and rubber manufacturers amounted to $4,000 in retail value. Don Zimmerman, of United States Rubber Co., was awarded the United Carbon Trophy for the low-gross score for members.

Other awards to members went to R. L. Sullivan, Jr., Reliable Rubber Co., longest drive; Al Laurence, Phillips Chemical Co., nearest to pin; J. E. Meyer Herron & Meyer of Chicago, putting on green; W. Bolling, Anderson Co., putting on course; George Smith, Williams-Bowman Co., blind bogey; Herman Boxser, Acadia Synthetic Division of Western Felt Works, Peoria handicap; George Popp, Phillips Chemical, horseshoe pitching; Jack Scanlan, Jr., Pure Carbonic Division of Air Reduction Co., baseball throw.

Further awards to guests were given Harold Peters, Burlington Mills, low-gross golf score; C. Oshinski, U. S. Rubber longest drive; Tom Bieterman, nearest to pin.

Jim Dunne, of C. P. Hall Co., was chairman of the committee in charge of arrangements.

NEWS ABOUT PEOPLE

R. L. Duncan has been appointed eastern division industrial chemicals sales manager of Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y., and in this capacity will supervise the activities of the district sales offices at Albany, Baltimore, Boston, Newark, New York, and Philadelphia. Also advanced were **G. E. Bernard,** who becomes district sales manager of the Atlanta area, succeeding **J. B. Harlow,** now district sales manager at Detroit.

J. A. MacIntire, Jr., has been appointed Chicago district manager for the Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O., succeeding **M. W. Clark,** who is retiring after 40 years of service with the company. Mr. MacIntire was formerly with the L. H. Gilmer Co. and the Quaker Rubber Co. He has also served with the Rubber Division of the National Production Authority in Washington, D. C.

Lewis F. Jolly, treasurer of Armstrong Rubber Mfg. Co., Des Moines, Iowa, has been elected vice president of the Quad Cities Control of the Controllers Institute of America. With total membership now more than 4,300, the Institute was organized in 1931 as a non-profit society of controllers and finance officers of the business, banking, manufacturing, distribution, utilities, and transportation professions.

James C. Walton has resigned from Boston Woven Hose & Rubber Co., Cambridge, Mass., to become vice president in charge of manufacturing and a director of the Bellofram Corp., Waltham, Mass., manufacturer of diaphragms and seals from synthetic fibers and the newer elastomers. Mr. Walton, the 1954 chairman of the Division of Rubber Chemistry of the American Chemical Society, spent his entire industrial career in various positions with Boston Woven Hose, following his graduation from Massachusetts Institute of Technology in 1923. He was appointed assistant general manager and director of manufacturing for BWH in 1950.



Fabian Bachrach

James C. Walton

Ralph W. Kumler has been appointed pulp and paper consultant for Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. Coming to the organization from a ten-year tenure of employment at American Cyanamid Co., Mr. Kumler formerly had been with Hercules Powder Co., Jessup & Moore Paper Co., and Bennett, Inc. He was active in pioneering the introduction of wax sizes to the paper industry and was at one time on the executive committee of the Technical Association of the Pulp & Paper Industry and also served as chairman of the industrial division.

Jerome J. Davis has become secretary-treasurer and consumer relations manager of Artistic Latex Form Co., Inc., Brooklyn, N. Y., manufacturer of rubber castings. Formerly head of Jerico Graphic Co., Mr. Davis expressed his intention of working closely with the advertising profession, particularly in the furthering of knowledge about the uses, limitations, and costs of rubber castings, information which has hitherto been kept secret, he said.



A. E. Powell

A. E. Powell has been named sales representative at General Latex & Chemical Corp., 666 Main St., Cambridge, Mass. He was formerly associated with United States Rubber Co., Flintkote Co., Pioneer Latex & Chemical Co., and Alco Oil & Chemical Co. He also served with Reconstruction Finance Corp., Synthetic Rubber Office, in Washington, D. C., during the early years of the synthetic rubber program.

Albert W. Cook has been appointed chief project engineer; **Donald G. Smellie** has been made head of the research and development section; and **Charles F. Luginbill** has been placed in charge of testing and laboratory activities at the aircraft wheel and brake development department of Goodyear Aircraft Corp., Akron, O. Mr. Cook has been with various subsidiaries of Goodyear since 1938. Before coming to Aircraft this year, Mr. Smellie, at one time a schoolteacher, had been associated with Holmes Automobile Co., The Hoover Co., and Industrial Service Co. Mr. Luginbill has been a member of the Goodyear organization since 1943.



Donald A. Comes

Donald A. Comes has been elected vice president of Farrel-Birmingham Co., Inc., Ansonia, Conn. Associated with the company since 1922, Mr. Comes was named general sales manager last year, a position he will continue to hold. He has been particularly active in developing the use of Banbury mixers in the rubber, plastics, linoleum, and paint industries.

Robert R. Moyer has been appointed manager of technical service for thermoplastic molding materials at Monsanto Chemical Co., Springfield, Mass., succeeding **R. D. Sackett,** who has been assigned to special studies relating to thermoplastics development. Mr. Moyer joined Monsanto in 1952 as a technical service representative.

Joseph Cleary has been appointed plant engineer at Quaker Rubber Corp., division of H. K. Porter Co., Inc., Philadelphia, Pa. He will be responsible for the specifications and design of all new equipment and maintenance and repair of plant facilities.

W. J. Laverty has become manager of government sales of The General Tire & Rubber Co., mechanical goods division, Wabash, Ind. Mr. Laverty, who formerly served the company at its Boston office, has also been associated with Pratt-Whitney Co. and Gilchrist Co.

George Rieger has been named to lead and coordinate market research activities of the newly formed commercial development department of The Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O. Mr. Rieger was formerly associated with Ethyl Corp. and Hercules Powder Co. and had served with the National Production Authority as acting chief of its plastics and coatings branch.

A. O. Rowlin, manager of Midland Rubber Corp.'s synthetic rubber plant at Torrance, Calif., has been given an assignment in Paris, France, by Minnesota Mining & Mfg. Co., St. Paul, Minn.



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Raymond H. Perkins, sales engineer for Farrel-Birmingham Co., Inc., Ansonia, Conn., will become assistant to the head of the company's Los Angeles office. **Richard N. Comes** will succeed Perkins as New England sales representative, handling the company's line of rubber and plastics processing machinery. Mr. Perkins joined Farrel-Birmingham in 1941 having been formerly associated with Rockbest Products Corp. Mr. Comes joined the company in 1951.



Raymond H. Perkins



Richard N. Comes

G. D. Mallory, manager of cords and fabric research at The Goodyear Tire & Rubber Co., Akron 19, O., recently addressed a gathering of engineers at the summer seminar of the Massachusetts Institute of Technology. His subject was "Applied Mechanics of Textile Structures."

A. D. Topping and **Edgar Everhart, Jr.,** both of Goodyear Aircraft Corp., also addressed this meeting.

G. A. Hudson has been appointed manager of truck tire sales of The Goodyear Tire & Rubber Co., Akron 16, O., replacing **H. E. Hoerster,** who has resigned from the company to become a Goodyear dealer. Mr. Hudson, formerly manager of the farm tire sales department, has been with the organization since 1936.

Robert U. Haslanger has been appointed to the administrative staff of Stauffer Chemical Co., 380 Madison Ave., New York 17, N. Y. Mr. Haslanger was formerly associated with Monsanto Chemical Co. at both the Texas and plastics divisions.

Donald B. McCammond has been appointed assistant to the vice president and general sales manager at Dewey & Almy Chemical Co., Cambridge, Mass. Also, **Paul Y. Clinton** will become a member of the administrative sales staff for sales analysis work. Mr. Clinton is a graduate of Boston College and the Harvard Business School. Mr. McCammond, a member of the Massachusetts bar, has served with Monsanto Chemical Co. and was a political writer for the *Christian Science Monitor.*

Vernon J. Liberty has been appointed assistant manager of the industrial rolls division, Rodney Hunt Machine Co., Orange, Mass. Mr. Liberty has been with the company four years and formerly was with Grinnell Corp. and Whitin Machine Works.

William E. Wade has been appointed technical director of Acme-Hamilton Mfg. Corp., Trenton, N. J., succeeding Norman J. Cyphers. Prior to this appointment, Mr. Wade served for 19 years in the mechanical goods division of United States Rubber Co., where he headed the development of hose and special rubber products.

Joseph H. Paden has been appointed laboratory director of the research division of American Cyanamid Co. at Bound Brook, N. J. Named also was **Mario Scalera,** who will become director of research. Dr. Paden has been associated with the company since 1937. Dr. Scalera, with Cyanamid since 1935, has headed research activities on dyes, pigments, and intermediates.

Harry J. Collyer has been appointed technical representative for Continental Europe and the British Isles for Godfrey L. Cabot, Inc., Boston, Mass. Mr. Collyer joined Cabot in 1946 and formerly had been with the research and development staff of Colgate-Palmolive-Peet Co. and the Division of Industrial Cooperation of Massachusetts Institute of Technology. His new headquarters will be at Cabot Carbon, Ltd., Stanlow, near Chester, England.

William O. Riley has been appointed superintendent of Anaconda Wire & Cable Co., Orange, Calif. His former position as assistant superintendent at the company's Anderson, Ind., mill has been taken by **Charles M. Thomas.** Also advanced were **Ray Clevenger,** now technical supervisor, and **Carl Eckstein,** who becomes assistant head inspector, both at the Anderson location.

John C. Siegmann has been elected secretary and treasurer of The Landers Corp., Toledo, O., succeeding **Percy E. Roper,** who has retired. Mr. Siegmann began his career as a baler in the company's factory 28 years ago. He became assistant treasurer in 1935, general purchasing agent in 1941, and vice president in 1952. Besides his new responsibilities as secretary, treasurer, and a director of the firm, he will also supervise purchasing, labor relations, and scheduling.

Joseph J. Tumpeer has been appointed senior vice president of Witco Chemical Co., 260 Madison Ave., New York 16, N. Y. A member of the firm since 1921, Mr. Tumpeer will direct its Pioneer Asphalt Division.



Joseph J. Tumpeer



Fabian Bachrach

Harry J. Collyer

OBITUARY

Robert T. Vanderbilt

Robert T. Vanderbilt, prominent industrialist and president of R. T. Vanderbilt Co., Inc., New York, N. Y., supplier of rubber chemicals and compounding ingredients, died on August 13 as a result of injuries sustained the day before when he was struck by a truck while crossing Lexington Ave. near 43rd St. in New York.

Mr. Vanderbilt organized R. T. Vanderbilt Co. in 1916 to distribute the output of the Georgia Kaolin Co., Macon, Ga. In 1919, he was joined by A. A. Somerville, and the company expanded into the

Bloom PROBLEMS?

Stauffer CHEMICALS SINCE 1885

CRYSTEX 85% Insoluble Sulphur

CAN SOLVE THEM AND:

1. improve product quality and appearance

Crystex, because of its high insolubility in rubber, cannot migrate and "bloom" like ordinary sulphur in your rubber compounds. This assures better surface appearance, particularly important in white side-walls and other light colored consumer goods in which "yellow spots" would be objectionable.

By preventing bloom, Crystex improves the tack of built-up stocks such as tire carcasses, belting, and valve patch frictions, thereby guaranteeing good adhesion after vulcanization.

2. save on plant operation costs

A stock blended with Crystex can be kept for long periods before vulcanization without the danger of blooming. Mixing and vulcanization schedules can be made more flexible to permit maximum utilization of machinery and labor without the worry of a "time element" imposed by the danger of bloom.

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Formulating with Crystex will allow variations to be made in factory recipes that tend to be "scorchy"; its use will control the degree of tackiness of factory stocks. The unusual characteristic of being insoluble in "anything and everything" except more sulphur may suggest additional uses in your formulations.

Enthusiastic acceptance of Stauffer CRYSTEX by the rubber industry has necessitated the construction of a new plant, and CRYSTEX is now produced at both Chauncey, N. Y., and Monongahela, Pa. Packed in 50-pound multiwall paper bags, Stauffer CRYSTEX is available in all quantities up to car-load.

Write for experimental samples or further information on the properties and uses of CRYSTEX.

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rubber field and over the years branched out into the paper, paint, and ceramics industries. The company now operates factories in New England, New York State, and the South.

Mr. Vanderbilt held membership in the Union Club, the Cloud Club of New York, and the Fairfield Country Club in Connecticut. He enjoyed golf and was considered an accomplished horticulturist.

The deceased was born in Brooklyn, N. Y., in 1886.

Surviving him are three sons and a sister.

Funeral services were held on August 16 at his home in Greens Farms, Conn.

Harold W. Quinby

Harold W. Quinby, 67, since 1929 general sales manager of I. B. Kleinert Rubber Co., New York, N. Y., died suddenly August 5 at his home in Newark, N. J., following a heart attack. He had been on the sales staff of the company since 1910.

The deceased was a member of the National Democratic Club; a 33rd degree Mason and member of the Kane Masonic Lodge 55, Newark; and a director, founder, and past president of the National Notions Association.

Funeral services took place on August 7 at the Forest Hills Presbyterian Church, Newark, where Mr. Quinby had been a ruling elder and treasurer. Burial was at Oakwood Cemetery, Mt. Kisco, N. Y.

He leaves his wife, a daughter, and two grandchildren.

Dwight N. Briggs

Dwight N. Briggs, for many years the New York area sales representative for The Sun Rubber Co., Barberton, O., passed away July 26 in a New Rochelle, N. Y., hospital after a one-month illness.

An alumnus of Grinnell College and a veteran of World War I, Mr. Briggs started his business career in the stationery field.

He was a founder and current treasurer of the Stationer's 12:30 Club of New York City; trustee, deacon, and clerk of the First Baptist Church, New York; a member of the Scarsdale (N. Y.) Town Club; and long active in Boy Scout work.

He was born in Big Rapids, Mich., in 1900.

The deceased is survived by his son, a daughter, and a brother.

Joseph M. Brisebois

Joseph M. Brisebois, 58, manager of market research for the tire division, United States Rubber Co., New York, N. Y., died in a local hospital on August 4 after a brief illness.

He had been with the company since 1929, where he started in the business development department and then spent many years in the fields of distribution planning, sales forecasting, sales research and analysis, and business development and marketing.

The deceased started in business for himself after graduation from Bowdoin College, but later joined E. I. du Pont de Nemours & Co., Inc., where he became manager of the cellophane division sales records department.

During World War I, Mr. Brisebois served in the U. S. Navy. He was also a member of the American Marketing Association, the American Management Assn., and American Statistical Assn.

Funeral services were held August 7 at the Frank E. Campbell "The Funeral Church," Inc., New York, followed by interment in Kensico Cemetery, Westchester County, N. Y.

Survivors include the widow and a brother.

Paul W. Shafer

Following an operation at Walter Reed Hospital, Washington, D. C., Paul W. Shafer died on August 17. He was Republican Representative in Congress from the Third Michigan District since 1937 and during his tenure of office was largely responsible for the legislation affecting the rubber industry that was passed during that time. Last year he also served as the Congressional adviser on the United States delegation to the Tenth International Rubber Study Group conference in Copenhagen, Denmark.

Mr. Shafer, who earned a law degree through correspondence courses, was a newspaper reporter and editor before entering politics in 1929.

He was born in Elkhart, Ind., 61 years ago.

The deceased saw service on the Mexican border as a member of the Indiana National Guard and was an honorary member of the Veterans of Foreign Wars. He also belonged to the Masons, the Elks, and the Lions. In 1952 he was named an honorary citizen of Korea.

A widower, Mr. Shafer leaves two sisters.

Louis G. Davenport

A heart attack caused the death, on July 23, of Louis G. Davenport, for many years an executive with The Laurel Co., Garfield, N. J.

He was born May 7, 1883, at Morristown, N. J., where he later attended the local public schools.

The deceased gained his business experience with Mattson Rubber Co., Reliance Rubber Co., and Uniflex Rubber Co. He then started with Laurel in 1929 in an executive capacity and was treasurer for many years before his retirement in 1953.

Funeral services were held in Belleville, N. J., followed by burial on July 25.

Mr. Davenport is survived by his daughter and two grandchildren.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Belden Mfg. Co.	Com.	$0.40 q.	Sept. 1	Aug. 17
Brunswick-Balke-Collender Co.	$5.00 Pfd.	1.25 q.	Oct. 1	Sept. 20
Canada Wire & Cable Co., Ltd.	Cl. A	1.00	Sept. 15	Aug. 31
	Cl. B	0.75	Sept. 15	Aug. 31
Crown Cork & Seal Co., Inc.	Com.	0.15	Aug. 27	Aug. 3
Flintkote Co.	Com.	0.50 q.	Sept. 10	Aug. 27
	$4.00 Pfd.	1.00 q.	Sept. 15	Sept. 1
General Motors Corp.	Com.	1.00 q.	Sept. 10	Aug. 12
	$3.75 Pfd.	0.93¾ q.	Nov. 1	Oct. 4
	$5.00 Pfd.	1.25 q.	Nov. 1	Oct. 4
General Tire & Rubber Co.	Com.	0.50 q.	Aug. 30	Aug. 20
Goodall Rubber Co.	Com.	0.15 extra	Aug. 11	Aug. 2
Johnson & Johnson	Com.	0.35 q.	Sept. 11	Aug. 27
Minnesota Mining & Mfg. Co.	Com.	0.35 q.	Sept. 12	Aug. 20
	$4.00 Pfd.	1.00 q.	Sept. 12	Aug. 20
Plymouth Rubber Co., Inc.	Com.	0.10 q.	Aug. 13	July 30
Sheller Mfg. Co.	Com.	0.37½ q.	Sept. 13	Aug. 12
United Elastic Corp.	Com.	0.60 q.	Sept. 10	Aug. 18
United States Rubber Co.	Com.	0.50 q.	Sept. 11	Aug. 23
	8% 1st Pfd.	2.00 q.	Sept. 11	Aug. 23
Westinghouse Air Brake Co.	Com.	0.40 q.	Sept. 15	Aug. 27

FINANCIAL

Allied Chemical & Dye Corp., New York, N. Y. First six months, 1954: net income, $22,694,984, equal to $2.56 each on 8,861,506 common shares, against $21,719,447, or $2.45 each on 8,856,421 shares, in the 1953 half; sales, $271,756,140, against $271,661,075.

American Cyanamid Co., New York, N. Y., and wholly owned subsidiaries. First six months, 1954: net earnings, $13,101,561, equal to $1.50 each on 8,707,437 common shares, compared with $16,848,647, or $1.95 each on 8,646,261 shares, in the first half last year; net sales, $196,082,684, against $197,532,813.

American Zinc, Lead & Smelting Co., Columbus, O., and wholly owned subsidiaries. Year ended June 30, 1954: net earnings, $1,548,313, equal to $1.80 each on 673,504 common shares, compared with $2,028,006, or $2.51 a share, in the preceding 12 months; sales, $61,604,838, against $70,785,747.

Blaw-Knox Co., Pittsburgh, Pa., and subsidiaries. First half, 1954: net profit, $2,159,334, equal to $1.42 each on 1,519,255 capital shares, against $1,971,887, or $1.40 each on 1,411,468 shares, a year earlier; sales, $55,357,654, against $60,497,750.

Philip Carey Mfg. Co., Cincinnati, O. First six months, 1954: net income, $1,009,016, equal to $1.21 a share, against $1,049,534, or $1.26 a share, in the 1953 half.

The Dow Chemical Co., Midland, Mich., and subsidiaries. Year ended May 31, 1954: net earnings, $33,425,004, equal to $1.42 each on 22,651,010 common shares, compared with $35,856,926, or $1.58 each on 21,986,862 shares, in the preceding fiscal year; net sales, $428,255,219, against $430,384,649; U. S. and Canadian income taxes, $24,400,000, against $50,700,000; current assets, $272,805,265, current liabilities, $122,702,330, against $326,489,154 and $199,004,659, respectively, on May 31, 1953.

U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. First six months, 1954: net loss, $88,490, contrasted with net profit of $134,552 in last year's half.

(Continued on page 854)

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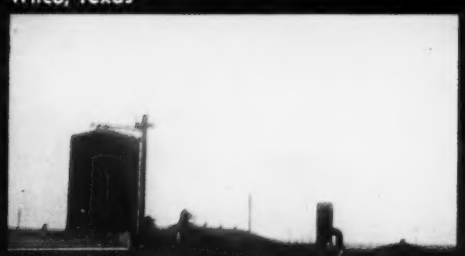


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Continental A—Medium Processing (MPC)—Witco No. 1
Continental F—Hard Processing (HPC)—Witco No. 6
Continental R-40—Conducting (CC)

Furnace Blacks

Continex® SRF—Natural Gas Type, Semi-Reinforcing
Continex SRF-NS—Natural Gas Type, Non-Staining
Continex HMF—Natural Gas Type, High Modulus
Continex HAF—Oil Type, High Abrasion
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NEWS FROM ABROAD

Annual Rubber Consumption of Western Europe Estimated at 600,000 Tons, and for the Soviet Bloc, 400,000 Tons

Whatever the feelings of West European states may be on the subject of political integration in a United States of Europe, there is a growing awareness of the need of economic co-operation and at least a willingness to consider measures which may in time lead to this end. In the rubber industry the advances made in recent years by the Soviet bloc apparently have brought home the fact that unless some concerted action is taken by the West European rubber industry, it is likely to be outdistanced. A necessary preliminary to any action is admittedly a clear picture of the widely divergent levels of production and costs in the various West European countries, and the factors here involved.

West European Rubber Consumption

J. C. Gerritsen, of Rubber Stichting, Delft, Holland, in Communication 271 makes a contribution toward a better understanding of the overall situation with his survey of rubber consumption in Western Europe.

He begins by recalling that up to the end of World War I, Europe was the leading consumer of rubber; then the United States moved into first place. Today Western Europe, with a population about 180% that of the United States, uses only 45% the amount of rubber, which works out at slightly more than two kilograms per head (4.4 pounds) against four times that amount for the United States. At that, the present average per capita consumption of Western Europe has increased considerably over the 1938 level, as it also has in the leading countries of the world. But nowhere is this advance more marked than in the Soviet Union, Dr. Gerritsen stresses.

West European countries he divides into large, medium, and small consumers, according to their present consumption. The first group, with annual total and per capita consumption of more than 20,000 tons and three kilograms (6.6 pounds), respectively, includes the United Kingdom, France, West Germany, and Italy; the second, with annual total and per capita consumption of 5,000 to 20,000 tons, and 1.5 kilograms (3.3 pounds), respectively, includes Sweden, Netherlands, Belgium, Spain, Austria, Switzerland, and Denmark; the third group, with annual total and per capita consumption under 5,000 tons and 1.4 kilograms (3.1 pounds), respectively, includes Norway, Finland, Portugal, Ireland, Greece, Yugoslavia, etc.

The development of annual total consumption by the above groups during 1950-53, as compared with 1938, is shown in the following table:

TABLE 1. WEST EUROPEAN RUBBER CONSUMPTION (IN TONS BY COUNTRY GROUPS

Consumers	1938	1950	1951	1952	1953
Large	258,000	462,000	518,000	493,000	512,000
Medium	40,000	68,000	88,000	85,000	94,000
Small	8,000	18,000	25,000	23,000	38,000
Total	306,000	548,000	631,000	601,000	644,000

Gerritsen points out that consumption has reached a certain equilibrium in recent years and adds that in the latter half of 1950 and all of 1951 there was, owing to prevailing circumstances, a tendency to buy more rubber goods, especially tires, than actually required to cover current needs, and that the reserve thus formed went toward filling normal demand in 1952 and 1953. On this basis actual consumption during 1950-1953 works out as shown in Table 2.

TABLE 2. ACTUAL RUBBER CONSUMPTION (IN TONS)—WESTERN EUROPE

	1950	1951	1952	1953
New rubber used in manufactures	548,000	631,000	601,000	644,000
Less surplus in finished goods	−28,000	−63,000		
Absorption of surplus			28,000	63,000
Consumption for normal requirements	520,000	568,000	629,000	707,000

In Table 3 the estimated amounts of rubber entering into imported and exported rubber goods are shown, at the same

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- We train your personnel in these modern plants . . . help you establish the latest formulae for processing natural and all new types of synthetic rubbers and textiles . . . latest "Know-How" in Tubeless Tires, Butyl Tubes, Rayon and Nylon Cords, Carbon Blacks. We also design factories and supervise machinery installations if desired.

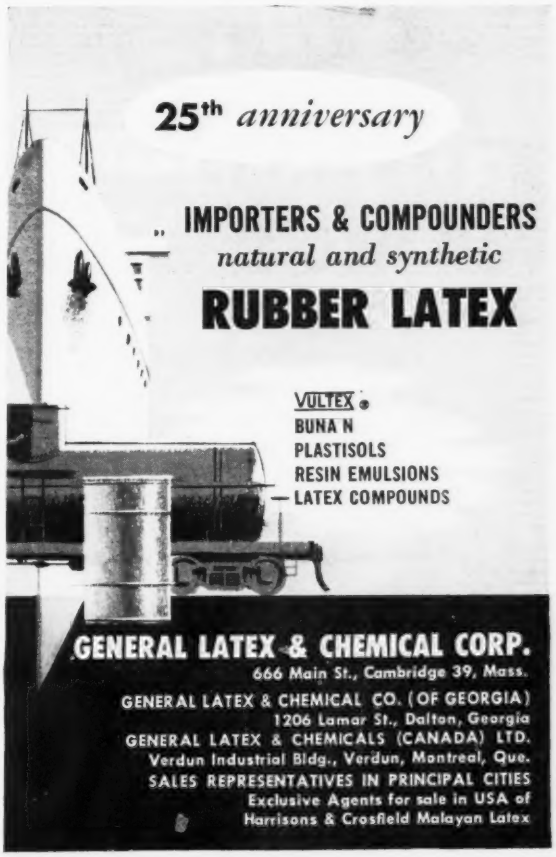
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time illustrating the development of West European foreign trade in the postwar years as compared with 1938. Only large and medium consumers are considered because of the insignificant share of the small consumers in this business.

TABLE 3. RUBBER USED IN EXPORT GOODS (IN TONS)—WESTERN EUROPE

	1938	1950	1951	1952	1953
Large Consumers					
Exports, outside Europe	22,600	38,000	46,700	37,400	35,600
Within Europe	11,800	19,000	21,200	17,900	22,600
Total exports	34,400	57,000	67,900	55,300	58,200
Imports	3,300	10,700	12,100	11,700	11,300
Medium Consumers					
Total exports	6,400	7,400	10,300	9,800	12,600
Imports	12,500	19,900	22,400	18,000	20,700
West European export surplus	25,000	33,800	43,700	35,400	38,800

In Table 4, the figures of Table 3 are shown as percentages of total rubber used by the two groups of consumers in the years under review:

TABLE 4. RUBBER USED IN EXPORT GOODS IN %

	1938	1950	1951	1952	1953
Large Consumers					
Exports, outside Europe	8.7	8.2	9.0	7.6	6.9
Inside Europe	4.6	4.1	4.1	3.6	4.5
Total exports	13.3	12.3	13.1	11.2	11.4
Imports	1.3	2.3	2.3	2.4	2.2
Medium Consumers					
Total exports	16.0	10.9	11.7	11.5	13.4
Imports	31.2	29.2	25.4	21.2	22.0
West European export surplus	8.0	6.2	6.9	5.9	6.0

It will be seen that while Table 3 indicates a substantial increase in the tonnage of exports during each of the years in the 1950-1953 period as compared with 1938, the ratio of rubber used in exported manufactures to total consumption, as shown in Table 4, is considerably lower.

Rubber Consumption in the Soviet Bloc

In another communication, No. 5027, of Rubber Stichting, Dr. Gerritsen discusses the rubber situation in the Soviet bloc.

The Soviet Government, as is known, has consistently been following a policy of attempting to step up industrial activity by setting ever higher goals in successive five-year plans. The fifth five-year plan, covering 1951-1955, inclusive, aims at a target which, if attained, will result in output three times that of 1940. Recently the Government has also begun to show lively interest in reviewing and expanding trade with countries outside the Soviet bloc. The rubber industry plays an important part in these plans, and Gerritsen reviews Russian consumption and production of raw rubber and rubber manufactures in an attempt to provide clues to the question: How will increased participation by the Soviet bloc in the international rubber trade affect the world market in these respects?

Data on the Russian rubber industry are sparse and not wholly reliable, but such as they are, Dr. Gerritsen has gathered them from various sources to form the basis of his analysis.

The following table, issued by the Secretariat of the International Rubber Study Group, London, shows imports (in tons) by the Soviet bloc from 1948-1953, inclusive:

NATURAL RUBBER IMPORTS—SOVIET BLOC

	1948	1949	1950	1951	1952	1953
USSR	100,000	105,000	82,500	63,000	123,000	42,500
Poland	3,600	12,000	5,500	11,500	20,000	20,000
Czechoslovakia	23,400	27,500	22,500	11,000	20,000	13,000
Bulgaria	150	925	775	275	575	800
Rumania	1,000	1,200	600	600	2,700	200
Hungary	3,000	8,500	6,500	250	4,750	6,500
East Germany	—	—	—	9,400	2,200	200
China	21,000	27,500	70,000	73,250	23,750	55,000
Hong Kong	450	1,520	200	2,050	1,870	5,000
Total	152,600	184,145	188,575	171,325	198,845	143,200

Figures for the individual countries fluctuate considerably from year to year, and it will be noted that those for the USSR fell to an unusually low level in 1953, although Russia could have imported up to 80,000 tons from England under a trade agreement with that country. It may also be recalled that since September, 1953, China has agreed to deliver to Russia 45%



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Rubber Stichting, Delft, Holland

Location of USSR Synthetic Rubber Plants

of the rubber obtained from Ceylon in the rubber/rice pact.

Besides these imports of natural rubber, Soviet Union (as distinct from the Soviet bloc) is held to have produced in 1953 at least 15,000 tons of natural rubber from domestic rubber-bearing plants, and 250,000 tons of synthetic rubber. Incidentally, Russian synthetic plants (also rubber goods factories) are widely scattered over a vast area, and the 1953 output came from factories in 12 centers as far apart as Leningrad in the west; Kemerowo in the north and east, in Siberia; and Eriwan, in Soviet Armenia, in the south. Russian synthetic rubber was supplemented by 35,000 tons supplied by Schkopau, in East Germany. Schkopau, the biggest and cheapest producer of synthetic rubber in Germany before the breakdown, at present produces 65,000 tons a year. (See accompanying illustration for location of Russian synthetic rubber plants.)

Russia thus gets about 300,000 tons of rubber a year from Soviet sources, and an additional 130,000 tons a year of natural rubber, according to Gerritsen's estimate. He assumes that some of this rubber—though a relatively small part—is reserved for stockpiling.

Figures on output of rubber manufactures are also incomplete, but taking various factors into account, Gerritsen concludes that the Soviet Union probably uses about 200,000 tons annually in the manufacture of tires and tubes for motor vehicles and for footwear alone, and furthermore that production of these and other rubber goods is nowhere near to being adequate for civilian needs.

Putting together all the information obtainable, Gerritsen judges that annual consumption by the Soviet Union certainly must be between 300,000 and 400,000 tons, and if other countries of the Soviet bloc are included, 400,000 and 500,000 tons, and we are reminded that the Soviet Union, after the United States, now ranks as the second largest rubber consuming country in the world, as important in this respect as England and France combined.

However future Russian policy regarding production of rubber goods for home consumption may develop, it is already clear that the large-scale entry of Russia on the international market will lead to important shifts in world distribution of raw rubber supplies and world trade in rubber manufactures.

MALAYA

Rubber Production Down, Shipments Up

Malaya produced 264,880 tons of rubber in the first half of 1954, a drop of almost 10,000 tons from the 1953 figure of 274,678 tons. The difference seems to be almost wholly due to decreased outputs on smallholdings. To be sure, a spurt occurred in May, which, however, was succeeded by a drop of about 5,000 tons in June. Total exports for the six-month period of 1954, at 457,194 tons, represented a substantial increase over the 1953 total of 408,635 tons, obviously in response to the rise in rubber prices that started this year.

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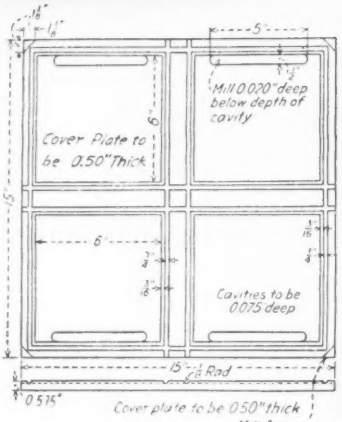
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Dealers' stocks in Singapore fell from 41,222 tons at the end of May to 34,398 tons in June.

Latex shipments from Malaya are given as 41,549 tons for the first half of 1954.

Indonesian Ban on Rubber Exports Hurts

The announcement around the end of June, 1954, that the Government of Indonesia had temporarily suspended exports of wet rubber to Singapore was followed by the news of the prohibition, effective July 11, of the export to Singapore also of higher grades as sheet, crepe, and brown grades 1, 2, and 3, flat bark, and all blankets, from Medan and other East Coast Sumatra ports. The Singapore Government is taking a serious view of the matter.

Packers, who import the higher grades for selection or re-export, will be affected; while the Singapore remilling industry —already in difficulties—has received an added blow. The industry, which depends on the shipments of low-grade Indonesian rubber for its existence, includes 15 remilling factories operating 577 mangles. By the middle of July, four factories, with a total of 329 mangles, had shut down; of the remaining 11 factories, with 248 mangles, only one was reported working full time.

In Singapore it is considered that the export bans are connected with the much-mooted and, at the time, still pending, rubber agreements with China and are also due to the desire of Jakarta to deal directly with consumer countries through a Central Purchasing Commission, which, it is understood, is about to be set up.

Other sources add that the Indonesian Government wishes to by-pass the speculating middlemen in Singapore and Indonesia whose increasing activities are held to cut into the profits of regular exporters as well as government revenue.

CEYLON

No Red China Rubber-Rice Pact for 1955?

Last fall it became apparent that the period of rice shortage and with it high prices for rice—an important incentive for the rubber-rice pact with Red China—was about to end. The chief rice producing countries were reporting bumper crops, and rice agreements with Burma as well as China were bringing so much of the grain into Ceylon that she actually had a fair surplus on hand for export. Now the time is near when negotiations for renewal of the rubber-rice agreement with China for 1955 will have to be undertaken, and a balance of the advantages and disadvantages will have to be drawn up.

Ceylon could very well do without rice from China, since she can get all she wants from Burma. Also, the high price paid by China for sheet has caused a notable switch from crepe to sheet manufacture with the disturbing results that Ceylon now also has a large surplus of sheet that must be sold on the open market, while the opportunity of earning dollars by the sale of crepe has shrunken. It is now felt here that China will have to offer a very favorable arrangement if Ceylon is to find it worth while to enter a new agreement for 1955.

Russian vessels have replaced Polish ships as carriers of Ceylon rubber to Red China, the *Ceylon News* reports. The first Russian vessel, built in Finland, incidentally, took on a cargo of rubber about the middle of March.

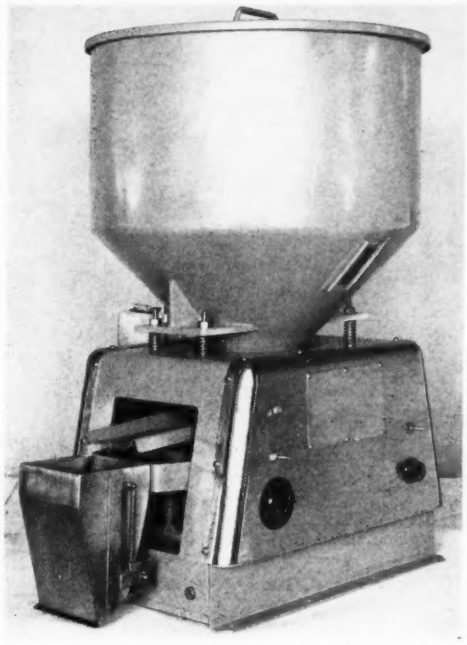
BORNEO

New Bicycle Tire Plant

Kalimantan Rubber Mij., in cooperation with German technicians, will set up a large factory for the manufacture of bicyle tires in South Borneo, it is reported. The necessary machinery is to be sent out from Germany, and a daily output of 1,000 tires and 500 inner tubes is expected, to start with. Indonesia would thus have two tire factories, since there is already an important factory in Bogor, Java, jointly controlled by Goodyear and Dunlop.

The news of the projected venture has been received with some anxiety by Netherlands tire manufacturers who have hitherto supplied demands not covered by the local factory.

New Machinery



IMSC "Starv-Way" Feeder

Compensated Feed Weigher

A NEW injection machine feeder with automatic weight-volume compensation has been announced by Injection Molders Supply Co., 3514 Lee Rd., Cleveland 20, O. Named "Starv-Way," the feed weigher is tied into the press circuit; each charge is automatically monitored in advance for continuous operation and to keep the weigher adjusted for press variations and bulk factor.

Use of feed weighers, the company reports, generally results in up to 15% savings of materials, as well as allowing for the reduction of injection pressures. Other advantages usually achieved are fewer strains in the product, tougher parts, and the elimination of sticking in the mold, the company adds.

Molding with a fully bottomed plunger is called starved-weighed molding and was worked out by research workers at Dow Chemical Co. to eliminate part sticking in the mold.

Strain Gage Scanner and Recorder

SR-4 strain scanning and recording instruments for use with the SR-4 strain gages of the company are being manufactured by Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. Records from the gages at 50 points can be taken continuously and automatically in a total of 30-90 seconds with the instruments, according to the manufacturer, thus greatly reducing the time and the skill required during any testing project which uses a number of gages.

The recorder provides three ranges of measurement: 0-2,000, 0-5,000, and 0-10,000 micro-inches. It can handle gages with mixed resistances ranging from 60-500 ohms and, by means of a factor control, gages with factors from 1.7-2.25. On each range, zero can be set at the left, center, or right of the recording chart.

The scanner unit, with contained electrical circuits and controls for switching, can be operated fully automatically or by manually advancing the system through each of the 50 strain gage channels. Other features of the scanner, which does not require a d.c. standardizing circuit or associated components, include: a rapid advance push-button to permit advancing the system at a rate of at least two channels without recording; a pen-lifting mechanism that permits indication of the gage output without recording; and a rotating hand on the face of the scanner which indicates the channel being used.



A fork lift truck picks up the whole pallet—forty bags—in one load. The edge of the fibre base sheet is turned up at the factory, so the chisel fork can slip easily under the unit. One man with a lift truck can unload a whole car in a short time.

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Edge Position Control frees an operator, and reduces waste at SERVUS RUBBER COMPANY

The Askania Edge Position Controls at Servus Rubber Co., Rock Island, Ill., position the knives on this rubber calender roll and trim the rubber to match the cloth base on which it is laid. This operation, formerly performed manually, required the full time attention of the operator. The Askania Edge Guide Control does the job automatically, does it better, and reduces the problems of later production operations.

If you have a web guiding problem, investigate the Askania Edge Position Control. Write for Bulletin 161.

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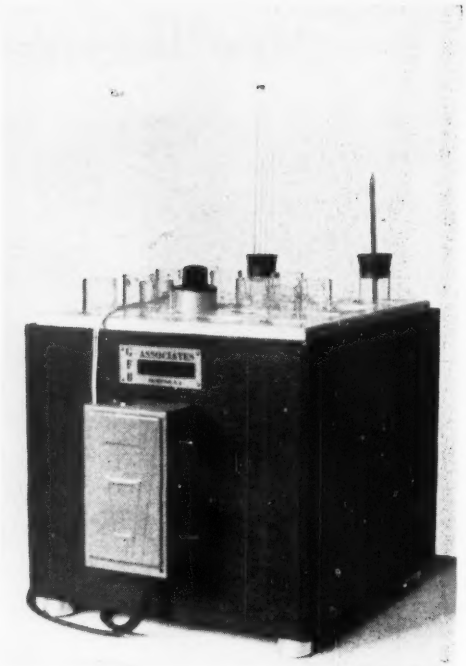


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Write for Brochure



GFB Multicell Heater

GFB Polyway Valve; Multicell Heater

TWO new pieces of equipment, both developed essentially for laboratory use, have been announced by G. F. Bush Associates, Princeton, N. J. These include an inexpensive stopcock, or polyway valve, and a multicell heater.

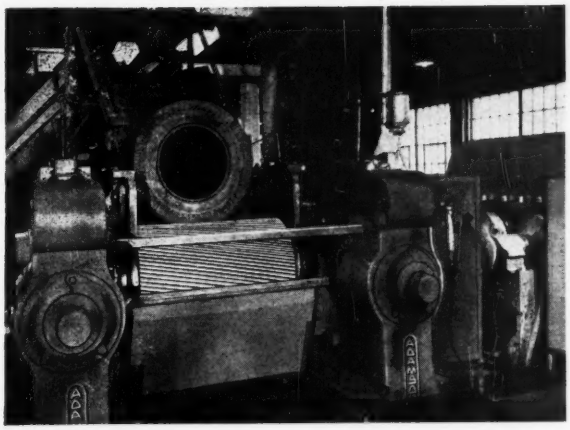
The valve, of new design, is said to provide considerably less pressure drop than conventional stopcocks, by means of a much larger bore for the same body diameter. Made of a variety of materials (except glass), the units have a bore range from 0.040-0.500-inch with a corresponding body diameter from ½-1½ inches. Available in two- or three-way models, the polyway valves may be connected to flexible or metallic tubing, external or internal thread for pipe, etc., according to the company, and are equipped with a precision-lapped joint and a self-tightening device to help prevent leakage.

The heater, with eight individual cavities available for containing sample tubes 38 by 300 millimeters, is intended primarily to eliminate the cross-migration of volatiles from various substances in the conventional oven. The cavities, or cells, all at the same temperature or pressure, may be used for heat and air aging, immersion and swelling studies, etc. Any of the specimen cells (a ninth cell for the thermoregulator is present) can be used to contain a pressure vessel for pressures up to 500 psi. It is claimed that operation of any one cell will not appreciably affect the temperature of the others. Temperatures up to 400° F. ± 1° F. are specified for the new unit, which is a 13-inch cube weighing approximately 20 pounds. Another model for temperatures up to 800° F. can also be supplied.

Portable Hand Tachometer

GENERAL ELECTRIC CO., Schenectady, N. Y., has announced a new portable, hand tachometer, featuring a scale-changing device which reportedly reduces misreading of its various ranges. Available in three different models, each having three ranges, the units are capable of measuring rotational speeds from 2-100,000 rpm. and linear speeds from 2-10,000 feet a minute, with accessories. Accuracy of the instruments is placed at ±1% of full scale under all conditions.

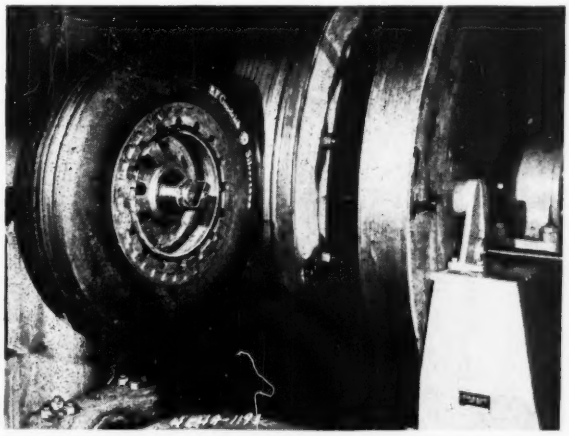
The tachometer consists of two basic units: a head, placed against the moving object; and an indicator, attached to the head by a two-foot flexible electric cable. The indicating unit is powered by a flashlight-cell with a life of approximately 2-3 years, and is equipped with a self-contained calibration circuit which compensates for voltage changes. Total weight of the equipment is 3¾ pounds, including the six-ounce head and the carrying case, which measures approximately 11½ by 7½ by 4 inches.



Machine for Cracking Off-the-Road Tires

Adamson Tire Cracker

A GIANT machine for use in cracking off-the-road tires has been announced by Adamson United Co., 730 Carroll St., Akron 4, O. With dimensions of 30 by 30 by 48 inches, the cracker has rolls separately driven from a special gear stand through wobbler-type universal couplings, with a 600-hp. motor incorporated in the drive. The separate gear stand contains all connecting gears and main drive gears, herringbone types mounted on fixed centers in anti-friction bearings. The main bearings are full-circle bronze lined with automatic feed grease lubrication.



Brake Testing Dynamometer

Goodrich Dynamometer

AN AIRPLANE brake-testing machine said to be capable of speeds up to 246 miles an hour was recently installed at The B. F. Goodrich Co. wheel and brake plant at Troy, O. The new dynamometer stands nine feet high, weighs 113 tons, and can test a wheel loaded to 70,000 pounds. These tests are required to simulate stresses sustained by wheels and brakes in landing and stopping today's giant airliners. The Goodrich dynamometer is said to be the only existing machine of its kind equipped with apparatus to duplicate the effects of windage and aerodynamic drag, the company reports.

Cesium Beta Gage for Sheet Weight Measurements

BG-5 light materials gage, an instrument which measures the weight of a continuously moving sheet by means of beta rays, has been introduced by Tracerlab, Inc., Boston, Mass. Feature of this instrument is the radioactive source material, Cesium-137,



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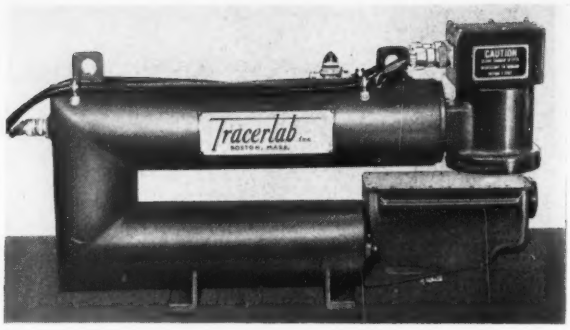
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Tracerlab Beta Gage with "C" Frame

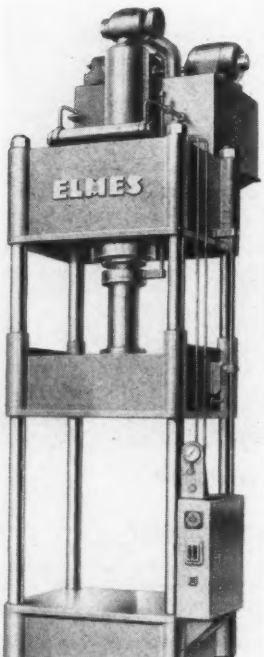
which has a half life of 33 years.

This long half life eliminates the necessity of frequent source replacements, the company states, to provide a definite advantage over similar gages which employ radiothallium with a half life of 2.7 years. The use of Cesium-137 also permits the source decay variables to be ignored, again because of the long half life.

The BG-5 model offers extreme sensitivity in the measurement of films and foils in view of its reported full-scale sensitivity of three milligrams per square centimeter. This is equivalent to a thickness change of 1.2 mils of typical plastic film.

The gage may be obtained with "C" frames having a variety of throat depths, or with "all-angle" scanning mounts for across-the-sheet profiles.

Elmes Fiber Glass Molding Presses



100-Ton Reinforced Plastic Molding Press

A COMPLETE line of the Elmes newly designed hydraulic presses, specifically built for fiber glass molding applications, has been announced as available from American Steel Foundries, Cincinnati, O. Standard capacities from 50-300 tons and specially made units of larger tonnage are manufactured.

Operation of the presses is completely automatic. The unit advances at a speed of 400 inches a minute until it reaches a predetermined (adjustable) position where it is slowed down to the desired pressing speed, variable between 16 and practically zero inches a minute. Cure of the molding is regulated by means of an automatic timer, which, at the end of the desired cycle, causes the press to open at a predetermined breakway speed (adjustable to practically zero) and then rise to the up-stop position (at 400 inches a minute). This up-stop position is adjustable to permit control of the stroke distance.

The hydraulic circuit is based on an Oilgear variable displacement two-way radial piston-type pump with three-position electric remote control and fitted with a low-pressure gear pump. No external control valves are necessary since the flow of oil in the system is reversed in the pump.

The particular press illustrated has a main ram capacity of 100 tons and a stripping capacity of 30 tons. It operates at a pressure of 2,460 psi., is constructed with a 36-inch stroke, and can accommodate dies up to 48 inches from left to right and 36 inches from front to back. The opening between bed and platen measures 84 inches (without spacer). Other specifications include: double acting ram, 10 by 8⅝ inches; and motor, 7½-hp., 1,200 rpm.

New Materials

Rubber-to-Metal Adhesives—Ty-Ply UP, Ty-Ply RC

TWO new additions to its group of rubber-to-metal adhesives have been announced by Marbon Corp., 1926 W. 10th Ave., Gary, Ind. Called Ty-Ply UP and Ty-Ply RC, the materials are said to be exceptionally suitable, when used as a two-coat adhesive system, for natural rubber stocks of both normal and low-sulfur contents, for standard and cold-polymerized GR-S, polybutadiene, oil-modified GR-S, arctic-type GR-S, and natural/GR-S blends, and certain types of nitrile rubber. Ty-Ply UP alone, as a single-coat adhesive, is an effective bonding agent for neoprene. Excellent shelf and working stability, insensitiveness to weather or ozone conditions, and effective operation over a wide range of curing temperatures are also attributed to the products.

Specifications released by the company report Ty-Ply UP to be a blue, free-flowing, single-phase liquid with a bulk density of 80 lbs./gal., which does not contain dispersed solids and requires little agitation. Preheating, thinning with solvents, or viscosity adjustments are unnecessary in normal operations. The adhesive is supplied at a viscosity of 30 seconds (#4 Ford cup) with a solids concentration of 20% and may be used for brushing or spraying, although a thinner spray may be obtained with xylene in up to 1:1 dilution.

Ty-Ply RC is reported to be a black liquid containing dispersed solids and having a brushing viscosity. It may be thinned for spray and dip operations with VM&P Naphtha in 2:1 dilutions; a gallon of the thinned material covers about 1,050 square feet of the product.

Monsanto Styrene—Hi Flow 55 Lustrex

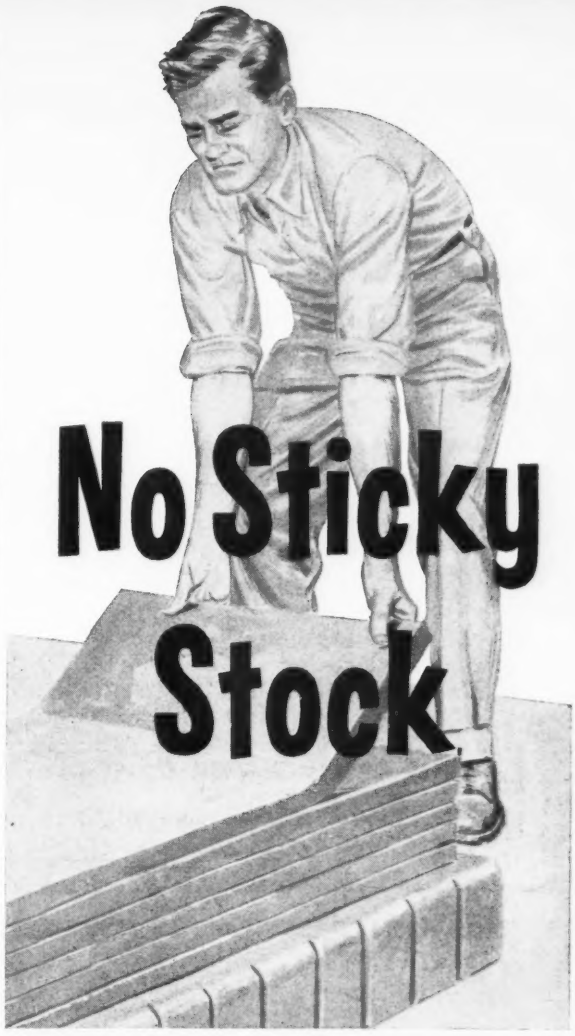
A NEW styrene molding compound with greatly improved flow qualities has been announced by the plastics division of Monsanto Chemical Co., Springfield, Mass. Called Hi Flow 55 Lustrex, the new plastic is applicable for use in injection molding and extrusion and was reportedly designed for molding thin sections and parts involving large surface to weight ratio, including brush backs.

Lower cylinder temperatures and pressures are now possible in the manufacture of certain plastic items, especially food containers and packaging articles, the company says, resulting in products with less strain. Mold cycles have been cut 10-15%, and temperatures, 25-50° F. Other molding problems such as short shots, flash, and sticking in the die can now be overcome through the use of Hi Flow 55 and without resorting to unusual production methods, according to the company.

Cementing, machining, lacquering, and other finishing techniques are the same for Hi Flow 55 as for general-purpose styrenes, Monsanto states. Mechanical, thermal, chemical, electrical, and molding data of the plastic are as follows:

Property	Value
Mechanical	
Tensile strength, psi	6000–7500
Tensile elongation, %	1.5–2.2
Elastic modulus in tension, psi	$4–5 \times 10^5$
Flexural strength, psi	8000×12000
Flexural deflection, inches	0.15–0.35
Impact strength Izod, notched ½- by ½-in., ft. lbs./in.	0.25–0.35
Hardness, Rockwell	M75–80
Thermal	
Heat distortion, °C	74–78
Temperature, °F	165–172
Chemical	
Specific gravity	1.05–1.07
Moisture absorption, %	0.03–0.04
Electrical	
Dissipation factor	0.0001–0.0005
Dielectric constant	2.45–2.65
Molding Characteristics	
Type	Thermoplastic
Injection molding temperature	350–600° F.
Pressure	10,000–18,000 psi.
Mold shrinkage	0.002–0.008 in./in.
Bulk factor	1.6–1.9

Technical Service Bulletin No. TPM-20, gives full details on Lustrex Hi Flow 55 and is available from the company.



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Silicone Rubber Adhesive—Dow Corning A-4000

THE development of a new silicone rubber adhesive which sets up without pressure in 24 hours at room temperature and which may be used to bond silicone rubber to itself or to aluminum, magnesium, stainless steel, Butyl rubber or Saran, has been announced by Dow Corning Corp., Midland, Mich.

Known as Dow Corning A-4000, the adhesive is blended with 2.5% by weight of the accompanying Catalyst XY-22. According to the company, the application of the material is a simple one: a uniform film is brushed on to the surfaces to be bonded, allowed to dry until tacky; the coated parts are then pressed firmly together to eliminate air bubbles, and permitted to cure. Maximum bond strength is obtained in from 3-7 days, but considerable strength develops in 24 hours, the company states.

Dow Corning tests on the product concluded that in general A-4000 forms a stronger bond with extrusions than with molded silicone rubber. Peel strengths of 15 psi., measured according to MIL-C-4003, were achieved between extruded Silastic and aluminum; while with molded silicone rubber, peel strengths ranged to 9 psi. In both cases the bond exhibited heat and creep resistance at temperatures through 100° C.

Cost of A-4000, the companys says, is comparable to that of other silicone adhesives.

Two Styrene Molding Resins

MOLDING resins RMD-4001, an acrylonitrile-styrene plastic, and SMD-3500, a general-purpose styrene plastic, were recently announced as available by Bakelite Co., New York, N. Y.

RMD-4001 (of Bakelite's C-11 group) is described as having the properties of outstanding moldability, high clarity, wide color possibilities, good flow, and fast set-up. It has freer flowing characteristics than former C-11 materials, without sacrificing any of the physical and chemical properties. A copolymer thermoplastic, it contains no volatile or fugitive plasticizers and can be molded to close tolerances without voids, the company reports. Physical specifications for the molded product are given as follows: tensile strength, 11,700 psi.; flexural strength, 15,700 psi.; and dimensionally stable temperature range, —40 to 190° F.

SMD-3500, embodying the qualities of all previous polystyrenes of the company, combines higher plasticity with faster set-up to permit increased production of molded parts. Developed for use on all types of injection molding machines, the new material is reported to flow easily even through pinpoint gates and dispersion nozzles.

Claremont Gold Inks and Pastes for Vinyl Plastics

NON-TARNISHING gold inks and pastes (Palegold Paste D-731 and Richgold Paste D-775) are now available to manufacturers of vinyl products, it is reported by Claremont Pigment Dispersion Corp., Brooklyn, N. Y., maker of the material. Other characteristics heretofore unavailable in conventional gold inks, such as perfect heat-sealing properties and excellent resistance to crock and blocking, are claimed. The gold pastes will enable fabricators of calendered, molded, and extruded vinyl to produce colored articles exhibiting high stability to processing temperatures and light exposure, the company says.

No discoloration is shown by gold ink prints which have been exposed to light under standard fadeometer conditions for 400 consecutive hours, and complete resistance to blocking was maintained by 100% coverage coatings, both face-to-face and face-to-back, at 160° F. under a pressure of one psi. for 24 hours, reports the company.

Tests on the gold pastes included subjecting colored articles to temperatures up to 350° F. for 400 continuous hours, after which no breakdown of color was observed, it is added. Both ink and paste are available in shades of pale gold and rich gold.

Colored Rayon Flock

VISCOSE rayon flock in ten brilliant shades of red, yellow, blue, and green, has been introduced by Cellusuede Products, Inc., 500 N. Madison St., Rockford, Ill. Called "Fire-Flock," the new material is said to have particularly easy flow for filling design patterns and can be applied with spray, mechanical beater-bar, or electrostatic equipment. The different types of electrostatic equipment in use, however, require specially adapted flock to avoid application problems.

Silicone Rubbers—SE-370 and -380

TWO new additions to the Class 300 silicone rubber compounds produced by General Electric Co., Pittsfield, Mass., have been announced as available. SE-370 and -380, as these compounds have been designated, are reported to exhibit the same low compression set (said to be the lowest of any known elastomer) over a temperature range up to 500° F. that characterizes this class of material.

The primary difference between these compounds and SE-360, the other formulation in this class, is in the durometer or hardness of their stocks. This increased hardness is advantageous to designers who require stiff stock for sealing and gasketing applications involving high pressures. Additional advantages of these Class 300 compounds are their low shrinkage and low moisture absorption properties; the former characteristic has already found application for the compounds in molds designed for organic rubber.

All three rubbers, red in color, are supplied with specific gravities 0.02 or less than the specific gravity of the cured compounds as given below:

	SE-360	SE-370	SE-380
Specific gravity	1.36	1.44	1.47
Hardness, Shore A	60±5	70±5	80±5
Tensile strength, psi.			
Typical	700	750	750
Minimum	600	600	600
Elongation, %			
Typical	130	110	100
Minimum	110	90	80
Linear shrinkage (ASTM slab), %	3	3	3
Compression set, %, (22 hours at 300° F.)	7±3	12±3	12±3
Stiffness temperature, °F	−45	−45	−45
Brittle point, °F	−70	−70	−65

Heavy Water

PRODUCTION of the most concentrated form of O^{18} heavy water available to date, containing 9.5 to 10.5% of O^{18}, is reported by the Dajac Laboratories Division of Monomer-Polymer, Inc., Leominster, Mass. The tagged compound, invaluable to biological and physiological research, is offered with certificates of analysis showing the mass spectrometer determination of the O^{17} and O^{18} content.

Approximately one kilogram of O^{18} isotope is scheduled for this year's production, the company announces, adding that it will also produce in special cases heavy water with O^{18} concentrations of from 3-30%. Custom preparations of O^{18} labeled compounds such as alcohols, ketones, organic acids, sulfuric and nitric acids, and various alkalies and oxides, are also being offered.

Phthalate Plasticizers—Flexol 810 and 812

THE availability in tank-car quantities of Flexol 810 and 812, two new higher alcohol phthalate plasticizers for vinyl chloride resins, has been announced by Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. Derived from distinctly different higher alcohols produced by the company, the plasticizers are said to be completely compatible with vinyl chloride resins, have reduced volatility, better low-temperature performance, and excellent electrical properties.

Other data reported by the company show the materials to be stable to heat and light while compounded in vinyl plastics, to be free of odor, and to exhibit resistance to abrasive action from upholstery sheeting. Plastisols prepared from Flexol 810 and 812 have excellent viscosity stability, although lower viscosities are obtained with Flexol 812. The plasticizers themselves are chemically stable and light in color.

Both substances are expected to be used widely in the vinyl plastics industry, particularly in the manufacture of calendered film and sheeting, electrical insulation, profile extrusions, coated fabrics, and slush-molded or dip-molded articles. The use of these plasticizers in the production of nitrocellulose lacquers and nitrile rubber compounds is also anticipated.

Physical properties of Flexol 810 and 812 follow:

	Flexol 810	Flexol 812
Specific gravity at 20/20° C.	0.9712	0.9711
Average weight per gal. at 20° C.	8.10	8.10
Absolute viscosity at 20° C., cps.	101	94
Solubility in water at 20° C.	Insoluble	Insoluble
Solubility of water in at 20° C., % by weight	0.32	0.33
Coefficient of expansion, at 20° C., per °C.	0.00075	0.00075
Boiling point at 5 mm. Hg., °C.	245	245
Direct current resistivity at 25° C., megohm—cm.	160×10^9	50×10^9

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New Goods



Wide-Base Earthmover Tire, 29.5x29, with Hard Rock Lug Tread Design

Wide-Base Earthmover Tire

A LOW - PRESSURE earthmover-type tire, constructed for a wider rim than present units, is being manufactured by Goodyear Tire & Rubber Co., Akron, O. Called the Wide Base Earthmover, the new product is reported to provide superior flotation, thus permitting faster, steadier operation of the vehicle.

The tire at present is made in only two sizes, 29.5 x 25 and 29.5 x 29, replacing the company's 24.00-25 and 24.00-29 sizes. It is mounted on a rim 25 inches wide (in contrast to the 17-inch rim used for the sizes replaced) and is available in two tread designs. Prices for the new tires are slightly higher than for the corresponding 24.00 sizes.



Sun Rubber's New Disney Figures

Disney Vinyl Dolls

ELEVEN-INCH-HIGH vinyl reproductions of three favorite Walt Disney characters, Mickey Mouse, Minnie Mouse, and Donald Duck, are currently being offered to youngsters by Sun Rubber Co., Barberton, O. The Mouse figures are dressed in colorful cotton outfits, while Donald's blue sailor suit is part of the toy.

Sun also is offering a floatable vinyl tub in which are contained Donald Duck's three nephews. The figures, molded into the tub side and peering over its edge, are decorated with bright colored caps; the tub itself is brown.

Both of these new lines will be sold by the company to retail outlets throughout the country for distribution to children.

Koroseal Bulb Syringes

A LINE of Koroseal bulb and feminine syringes has been introduced by The B. F. Goodrich Co., Akron, O. The bulbs can be flexed thousands of times more than ordinary bulbs, it is reported, and are provided with non-absorbent smooth interiors and brilliant smooth exteriors to facilitate cleaning.

Four models of the new feminine syringes, which employ the bulbs, are available in red or white, with a diffused spray pipe, round adjustable shield, and protective cap. Two "Stowaway" models, with retractable pipes of Koroseal, are also made.



Filled and Collapsed Bulk Containers

Rubber-Fabric Containers for Bulk Shipments

GRANULAR and powdered materials are being handled in collapsible synthetic rubber and fabric containers developed by United States Rubber Co., Rockefeller Center, New York 20, N. Y. Chemical manufacturers are presently using these containers to ship polyethylene and polyvinyl chloride resins, and producers of carbon black, clay, flour, sugar, reclaimed rubber, and many other materials are testing the packages for possible use in their fields. Arrangements can be made to lease the units at a monthly rate.

Two sizes of these containers are available, the 500-gallon (70-cubic foot) unit and the 2,500-gallon (370-cubic foot) unit. Both are fabricated with plies of high-strength cord fabric and synthetic rubber, with extra plies at points of greater stress, and with flexible cables. Several strong lifting cables are used in this respect for internal reinforcement; all are attached to a single lifting ring at the top of the container. The exterior and the inner lining are of neoprene for resistance to weathering and chemicals.

When filled, the smaller unit stands seven feet high and slightly less than four feet in diameter; while the 2,500-gallon container measures eight feet in both height and diameter. When emptied through the six-inch closures at both ends of the cylindrical shape, the containers measure 76 by 36 by 10 inches, and 96 by 96 by 24 inches, respectively. Air or gas can be pumped into the filled containers to provide additional rigidity during handling.

The company, which has been manufacturing 55-gallon collapsible containers since 1951, expects the new products to result in three savings for the shipper: reduction in handling and packaging costs at the point of origin and in shipment costs.

Velon Spindle Tape

THE development of a new type of spindle tape for use in spinning and twisting operations in the textile industry (i.e., transmitting power from source to spindle) has been announced by Firestone Plastics Co., Pottstown, Pa. Woven by Russell Mfg. Co., Middletown, Conn., the Velon tape has been tested for more than two years in Firestone's textile mills. During this period it has demonstrated stretch, lint, fire, and wear resistances that are superior to tapes made of other fabric, according to the company.

The new tape is woven with a nylon filling, a material which is of opposite polarity to Velon. This construction results in a tape that is electrically neutral and hence resists the adherence of foreign particles. One such foreign particle, lint, is reported to be the major cause of tape slippage.

Reduced slippage also results from the non-stretching property of Velon, the company reports, stating that a more constant speed ratio and therefore a reduction in power consumption are advantages to be gained from this feature. The non-combustible and self-extinguishing properties of Velon are naturally desirable from a safety standpoint, and the long wearing properties of the material, said to permit as much as 63% more service life than conventional tapes, is another feature which recommends the new product to the textile industry.

Elastic Cord for Marine Use

AN ELASTIC cord, especially designed for marine use in anchor lines, mooring lines, and general service lashing, has been developed by Russell Mfg. Co., Middletown, Conn. Available in either white or nautical blue, the Rusco Elastic Marine Cord is made with a glazed yarn cover to resist abrasion and marine rot. Its production and distribution are carefully controlled, and all cord is dated to insure its freshness when it reaches the user, according to the manufacturer.



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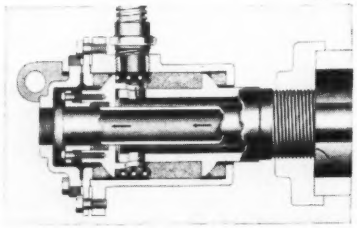
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Editor's Book Table

BOOK REVIEWS

"Matthews' Textile Fibers." Edited by Herbert R. Mauersberger. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 6 by 9½ inches, 1292 pages. Price, $16.50.

Since the publication of the fifth edition of this book in 1947, synthetic chemists have made seven-league strides in the development of such fibers as Orlon, Dacron, Vicara, Dynel, Acrilan, and X-51, and it is these advances which are incorporated in this new and sixth edition. The book, representing the combined efforts of 25 leading technologists and 14 prominent business organizations, now presents a total picture of the textile industry, including the history, production, and utilization of animal, plant, mineral, and man-made fibers, together with their physical and chemical properties, X-ray identification, testing techniques, and the latest economic data and statistics concerning them. Profuse illustrations clarify and add to the text.

"A French-English Dictionary for Chemists." Second Edition. Austin M. Patterson, Professor Emeritus of Chemistry, Antioch College. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 5½ by 7 inches, 476 pages. Price, $6.50.

The first edition of the above work was published in 1921, and now, after more than 30 years, the second completely modernized edition makes its appearance. The vocabulary has grown from 38,000 terms to about 42,000 terms, although many terms having the same spelling and meaning in French and in English have been omitted to make place for new terms from chemistry, related sciences, and industry. These new terms have been checked against an impressive list of French and English technical dictionaries, and, in addition, the chemical nomenclature has been revised to conform to the latest decisions on the matter.

In compiling the new dictionary, the author has also considered the various pitfalls in the way of the beginner and of those whose French has become rusty, such as idiomatic phrases, irregular verb forms, and the words which "though posing as old friends, do not mean just what they ought to."

The introduction includes a number of notes calculated to facilitate the use of the vocabulary which, it may be noted, contains a larger number of general words than many a pocket dictionary. All in all, the new edition should find a welcome place in the reference library of any chemist.

"Pumps." Frank A. Kristal and F. A. Annett. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. Cloth, 6 by 9½ inches, 388 pages. Price, $6.50.

This second edition of a text first issued in 1940 is intended to provide an up-to-date and definitive account of the entire field of industrial pumps; this book should prove valuable as source material to both the technical and the semi-technical—designers, manufacturers, sales representatives, operators, and maintenance men. Chapters cover the various types of pumps available; specific applications such as boiler-feed, condensate, deep-well, sewage and sludge, chemical, oil-field, oil-refinery, and paper and pulp mill; performance data and limitations; the ordering of pumps; their installation, maintenance, and repair. The book is well illustrated with pump cross-sections and photographs, performance graphs, and tables of comparative data.

NEW PUBLICATIONS

"Vulcan 3 and Vulcan 6 in Natural Rubber Treads." Technical Report RX-24. July, 1954. Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 14 pages. The results of a series of tests conducted by Cabot to determine the comparative value of oil furnace blacks and channel blacks in natural rubber tire treads are contained in this booklet. The oil furnace blacks used were Vulcan 3 High Abrasion Furnace (HAF) and Vulcan 6 Intermediate Super Abrasion Furnace (ISAF). According to the tests, these blacks imparted longer life to the treads than did Spheron 9 Easy Processing Channel (EPC) Black and Spheron 6 Medium Processing Channel (MPC) Black.

"Small High Precision Cutters." Index No. App. 209. Taylor-Stiles & Co., Riegelsville, N. J. 4 pages. Illustrated in this booklet are the firm's specialized cutters for use when working with or preparing such items as staples, synthetic fibers, fiberglass, flock, rubber bands, and silk cocoons.

"Phillips 66." Bulletin 510, Fourth Edition. Phillips Petroleum Co., Bartlesville, Okla. 100 pages. This is a catalog of the various hydrocarbons separated and distributed by the company and lists the specifications, properties, types of containers required, and shipping notes for each. Also included are test method tables for hydrocarbons. The company makes paraffins, cycloparaffins, olefins, cycloolefins, diolefins, aromatics, and special-purpose products.

"Plastolein Plasticizers." Emery Industries, Inc., Carew Tower Cincinnati 2, O. 32 pages. This revised booklet gives descriptions and specifications of the company's line of monomeric and polymeric plasticizers, and an appraisal of such factors as low-temperature flexibility, volatility, water extraction, oil extraction, heat stability, and light stability.

"Monsanto Plasticizers." Monsanto Chemical Co., 800 N. 12th Blvd., St. Louis 1, Mo. 64 pages. Written and illustrated on a broad level of interest that will appeal to both the semi-informed and the expert, this booklet is a concise, but exhaustive discussion of the entire field of plasticizers, as used in the rubber and plastics industries and for coatings. Included here are sections on the definition of a plasticizer, the proper selection of the substance, application data, and information on specific Monsanto plasicizers; the last is graced by particularly interesting viscosity curves for phosphate and phthalate plasticizers, and for phthalyl glycollates.

"Cyanamid and Its Products." American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 28 pages. This illustrated booklet traces the history of the company and describes its chemical products and services.

"Hycar Technical Newsletter." Vol. 3, No. 7, July 1954. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. 4 pages. This issue discusses the use of the company's Hycar 1312 liquid nitrile plasticizer in vinyl plastisols formulations and specifically with Geon 121 vinyl. Tables are included showing temperature-viscosity comparisons in connection with resin dispersibility in Hycar 1312, effect of cure on thermoplasticity of Hycar 1312/Geon 121 plastisols, effect of cure on physical properties of tensile sheets and 20-mil films, and physical properties of plastisols containing varied amounts of Hycar 1312 and Good-rite GP-261. Also given are comparative data on Geon 121-Hycar 1312 printing roll formulations.

"Dag Dispersions for Industry." Bulletin No. 460. Acheson Colloids Co., Port Huron, Mich. 8 pages. Listed here are 40 basic dispersions of graphite, molybdenum disulfide, vermiculite, and zinc oxide in various carriers, together with properties and typical applications. The latter include use as rubber lubricant, as well as lubricants in the metal working and electrical industries.

Publications of Naugatuck Chemical Division of United States Rubber Co., Naugatuck, Conn.

"Kralastic." 10 pages. This discussion of the properties and uses of Kralastic plastic pipe is a reprint of a talk given by Paul M. Elliott before the January, 1954, meeting of the Society of Plastic Engineers, Inc., in Toronto, Ont., Canada.

"Rubber Chemicals." 12 pages. The physical and compounding properties of the dithiocarbamate accelerators manufactured by the company, specifically, Methazate, Ethazate, Butazate, and Arazate, are presented in this booklet. Product applications explained are wire insulation, drug sundries, and foam sponge.

Publications of the Bakelite Co., 30 E. 42nd St., New York 17, N. Y.:

"Bakelite C-8 Resin BR-18774." Technical Bulletin No. 1. 6 pages. The physical properties of this high-viscosity epoxy resin, together with a discussion in text and graphs of the types of hardeners that may be used in combination with it, are contained in this folder.

"Bakelite C-8 Resin BR-18795." Technical Bulletin No. 2. 6 pages. This folder lists the physcial properties of this low-viscosity epoxy resin and includes data and performance graphs of the types of hardeners to be used in combination with it.

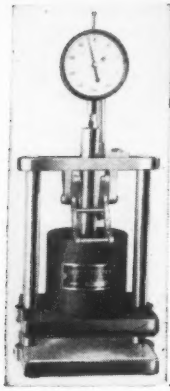
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"Columbian Carbons in Natural and Synthetic Rubbers." Binney & Smith Co., New York, N. Y. Looseleaf, 68 pages. In this publication a comparative evaluation of the producing company's carbon blacks, both as regards their basic colloidal properties and their reinforcing action in natural and synthetic rubbers, is presented.

Sections on compounding natural, GR-S, Butyl, and nitrile type rubbers include recipes, curves, and data sheets. In the latter, data on tensile, elongation, hardness, and rebound are presented in graphical form for the channel and furnace blacks. Final sections explain mixing and testing procedures.

The publication is available only to rubber compounders and technologists.

Publications of E. I. du Pont de Nemours & Co., Inc., rubber chemicals division, Wilmington, Del.:

"Procedures for Determining the Extractable Components from Food Packaging Materials Containing Neoprene." Report No. PR-4. 36 pages. In order to determine the degree of resistance of neoprene-treated paper products to various foodstuffs, du Pont chemists have devised a series of analytical procedures subjecting paper containing 5% Neoprene Latex Type 735 to the following solvents: water, Ringer's solution, sodium carbonate (pH 10), acetic acid (pH 3), lactic acid (5%), pickle juice, and peanut oil. These procedures are described in detail in this publication, together with conclusions arrived at which showed that neoprene-treated paper may be used to package a wide variety of foodstuffs, including dry cereals, butter, oleomargarine, shortening, lard, cheese, and milk.

"Neoprene in Paper and Board for Food Packaging." Report No. PR-5. 4 pages. The physical and chemical properties of bags, cartons, and wraps treated with neoprene and used to package a great variety of foodstuffs are described in this bulletin. The most important properties claimed for such packagings are high wet strength and physiological inertness.

"Neoprene Latex Type 736." Report No. 54-1. 16 pages. This material, a modification of Type 735, contains additional stabilizers to permit easier addition to paper pulp in open and closed white water systems. Like Type 735, Type 736 imparts excellent wet strength and enhances the dry physical properties of paper. This publication describes Type 736, ways of handling it, and methods for treating paper pulp.

Publications of the Office of Synthetic Rubber, Federal Facilities Corp., Washington 25, D. C. All are intended for insertion in "Specifications for Government Synthetic Rubbers, Revised Edition, Oct. 1, 1952."

"Specifications for GR-S 1000 and 1001." August 2, 1954. 1 page each. These catalog inserts are revised specification limits of the rubbers.

NOTE: Production of GR-S 1005 has been discontinued, and the page describing it should be removed from the catalog.

"ASTM Standards on Plastics." May, 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Heavy paper cover, 6 by 9 inches, 741 pages. Price, $5.75. One hundred forty-two ASTM standards are contained in this latest compilation, including 92 test methods, 32 specifications, 14 recommended practices, and four lists of definitions relating to plastics, methods of mechanical testing, and conditioning and weathering. Standards cover properties; analytical methods; molds and molding processes; conditioning; plates, sheets, tubes, rods, and molded materials; and electrical tests.

The new material section includes specifications and test methods for: cellulose acetate sheet and film for primary insulation; non-rigid thermoplastic compounds for automotive and aeronautical applications; shrinkage of molded and laminated thermosetting plastics at elevated temperature; tension testing of vulcanized rubber; and measuring water vapor transmission of materials in sheet form.

"Rubatex Newsletter." August 16, 1954. Rubatex Products, Inc., New York, N. Y. 3 pages. The second of a series of technical discussions by R. J. Noble, vice president of the company, this publication concerns the problems of shrinkage in closed-cell rubber goods and suggests production methods to prevent such shrinkage.

"1954 Roster—Washington Rubber Group." Price: one copy free to members, extra copies, $1; non-members, $5. Names of newly elected officers, members, and membership affiliations, as well as the agenda of the organization's activities and a copy of its constitution, are included in this publication. Present secretary of the Group is Wm. B. Dunkle, Goodyear Tire & Rubber Co., Washington, D. C.

"Techniques of Plant Maintenance and Engineering—1954." Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y. Cloth, 8½ by 11¼ inches. 291 pages. Price $7.50. The fifth in a series of transcripts of the Plant Maintenance & Engineering Conference held annually in Chicago, this volume contains the texts of papers read by 24 factory maintenance experts, together with a record of the question-and-answer period which followed each talk. Also included here is a summary of 20 round-table discussions pertaining to diverse industries. Among the papers read at the conference was one on "Preventive Maintenance—Pros and Cons," by O. W. Graveley, works engineer, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., Niagara Falls, N. Y. Others included "Problems Met in Handling Maintenance Labor," by E. G. Balzano, plant engineer, Seiberling Rubber Co., Akron, O., and "Corrosion Control and Prevention," given by L. R. Honnaker, supervisor, engineering materials consultants, engineering department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

"ABA." ABA Tool & Die Co., Inc., Manchester, Conn. 12 pages. This illustrated booklet describes a selection of the molds, tools, dies, and machined parts made by the company for the plastics industry.

"The Marblette Mirror." Vol. 1, No. 1, Summer, 1954. Marblette Corp., Long Island City, N. Y. 4 pages. This is the first issue of a bulletin to be regularly issued by the company and is concerned with news of its own activities, as well as information on the plastics industry across the nation.

"Flexaust Hose and Portovent Duct." Bulletin No. 40. The Flexaust Co., New York, N. Y. 4 pages. Illustrated here are the company's hoses and ducts for moving air, dust, fumes, gases, and materials.

"Industrial Rubber Products." Catalog 25C. Raybestos-Manhattan, Inc., Passaic, N. J. 20 pages. The construction, application, and performance data of the company's V-belts, transmission belts, conveyor belts, hose, and molded products are contained in this illustrated publication.

"Advance Vinyl Stabilizers." Advance Solvents & Chemical Corp., New York, N. Y. 2 pages. Descriptions of 24 of the company's vinyl resin stabilizers manufactured for use in calendering and extruding, rigid compounds, plastisols, and organosols solutions are included in this bulletin.

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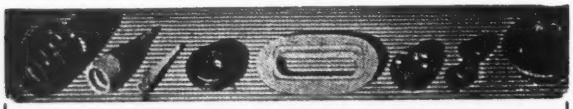
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Letter to the Editors

(Continued from page 800)

tries, is proving highly attractive to young men in the industry. Candidates are conscious of the value of a certificate sponsored by a high-level international body, and the rubber industry will greatly benefit by having adequately trained staff at its disposal.

To us in Europe it is of interest to note that there is presumably a tendency in the United States to follow similar lines, resulting from the fact, as we learn from Mr. Seaman's paper, that rubber courses in America vary widely in character. If some general system, in line with that now established in Europe, could be adopted, we feel that perhaps a basis might be found for a diploma in rubber technology earning worldwide recognition, and in this way the rubber manufacturing industry might give a nice example of worldwide co-operation.

R. Houwink, Director General
Rubber Stichting, Delft, Holland

MARKET REVIEWS

RUBBER

Trading was very limited on both the spot and futures rubber markets over the period from July 16 to August 15, and prices dropped considerably. Physical market prices fell as much as 1⅜¢ a pound (R.S.S. stocks); while prices on the Commodity Exchange dropped an average of 1½¢ a pound for all months.

Futures trading was quite slow, with the total number of lots traded exceeding 100 on only four days during the period. September stocks began the period at 24.50¢ a pound, dropped slightly during the first week, but again reached that figure on July 22 and 26. Following these peaks, the price declined steadily to the period low of 23.00¢ on August 13.

Futures sales during the second half of July amounted to 8,740 tons, making a total for that month of 24,250 tons. Sales during the first half of August totaled 6,060 tons.

COMMODITY EXCHANGE
WEEK-END CLOSING PRICES

Futures	June 26	July 17	July 24	July 31	Aug. 7	Aug. 14
Sept.....	23.60	24.50	24.00	24.00	23.65	23.00
Dec.....	23.80	24.73	24.55	24.17	23.94	23.37
1955						
Mar.....	24.10	24.95	24.65	24.25	24.00	23.47
May.....	24.24	25.05	24.60	24.30	24.10	23.52
July.....	24.35	25.05	24.70	24.35	24.15	23.62
Sept.....	....	25.05	24.80	24.35	24.15	23.62
Total weekly sales, tons	3,460	4,110	4,710	3,870	2,490	3,570

Prices on the physical market followed the same general pattern as shown on the futures market, starting the period at a relatively high point, dropping somewhat only to rise again after a week, and then declining slowly to the low point at the end of the period. Some observers attributed the mid-period rise and subsequent fall to the fluctuating political situation in the Far East.

An example of the price pattern, followed closely by the other grades, is Ribbed Smoked Sheet #1, which started the period at 24.63¢ a pound, dropped to 24.00¢ on July 20, rose to the period high of 24.75¢ on July 26 and 27, then declined, with fluctuations, to the period low of 23.25¢ on August 13.

July monthly average spot prices for certain grades were as follows: R.S.S. #1, 24.57¢; R.S.S. #3, 24.31¢; #3 Amber Blankets, 24.44¢; and Flat Bark, 20.19¢.

NEW YORK SPOT MARKET
WEEK-END CLOSING PRICES

	June 26	July 17	July 24	July 31	Aug. 7	Aug. 14
R. S. S.: #1	23.63	24.63	24.38	24.13	23.75	23.25
2.....	23.50	24.50	24.25	24.00	23.63	23.13
3.....	23.38	24.38	24.13	23.88	23.50	23.00
Latex Crepe						
#1 Thick.	32.50	33.88	33.50	33.50	33.50	32.75
Thin..	27.38	29.25	29.25	29.13	28.50	28.00
#3 Amber Blankets	23.25	24.38	24.38	24.63	24.00	23.63
Thin Brown Crepe.	22.13	23.38	23.63	23.88	23.25	22.88
Flat Bark..	19.00	20.13	20.00	20.13	20.00	19.50

Latex

The tight situation noted last month in the latex market has been relieved for the most part, and both importers and factories appear to be comfortably stocked. Labor difficulties at some companies, if continued, may see some of their stock enter the open market.

Prices, which were pushed up by the increased price of the GR-S latices, continued at a relatively high level, in some cases reaching 36¢ a pound (dry solids) during July. Observers believe that this price will drop slightly to about the 33¢ level, and that latex will remain in ample supply during the remainder of the year.

Final May and preliminary June domestic statistics for natural and synthetic rubber latices follow:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Month-End Stocks
Natural latices				
May.....	0	3,806	5,969	8,907
June.....	0	5,000	5,642	8,898
GR-S latices				
May.....	3,838	0	3,394	5,180
June.....	4,019	0	3,653	5,705
Neoprene latices				
May.....	680	0	586	1,110
June.....	620	0	587	1,041
Nitrile latices				
May.....	623	0	348	655
June.....	585	0	390	656

SCRAP RUBBER

Vacations and labor difficulties combined to limit trading on the scrap rubber market over the period from July 16 to August 15. Black passenger tubes and synthetic Butyl tubes were the only items to change hands, according to reports.

Price on some items remained unchanged, although tire buffings dropped $1 per ton at Akron, O.; red passenger tubes declined ½¢ per pound; black passenger tubes increased ¼¢; and Butyl tubes dropped slightly at Akron.

Current dealers' buying prices for scrap rubber grades, in carload lots delivered to mills at the points indicated, follow:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires.....	$9.00	$11.50
S. A. G. auto tires.....	Nom.	13.00
Truck tires.....	Nom.	14.00
Peelings, No. 1.....	40.00/41.00	40.00/42.00
2.....	Nom.	Nom.
3.....	15.50	Nom.
Tire buffing.....	18.00/20.00	15.00/16.00
	(¢ per Lb.)	
Auto tubes, mixed.....	2.75	3.00
Black.....	4.75	5.00
Red.....	7.00	7.50
Butyl.....	2.25	2.25

RECLAIMED RUBBER

Light trading continued on the reclaimed rubber market during the period from July 16 to August 15, with some companies reporting moderate improvement in their individual sales. Overall conditions, however, are expected to improve soon.

Observers foresee increased consumption of reclaim with the expected sale of government synthetic rubber facilities and consequent increase in selling price of the GR-S polymers and of natural rubber. Butyl reclaim, in particular, should be in greater demand because of recent price rises for the new rubber and the increased demand for tubeless tires. Some interest is being exhibited in crumb-form and pelletized reclaims, although the use of reclaimed rubber in camelback has declined to a large degree. Also, the relatively large use of oil-extended GR-S has continued to cut into reclaim sales.

Final May and preliminary April statistics on the domestic industry have been made public. May figures, in long tons, were: production, 21,184; imports, 132; consumption, 20,536; exports, 1,071; and month-end stocks, 31,105. Preliminary data for June, also in long tons, were: production, 22,182; imports, 81; consumption, 22,164; exports, 1,061; and month-end stocks, 31,362.

There were no changes in reclaimed rubber prices during the period, and current prices follow:

Reclaimed Rubber Prices

	Lb.
Whole tire: first line.....	$0.10
Fourth line.....	.0875
Inner tube: black.....	.15
Red.....	.21
Butyl.....	.125
Pure gum, light colored.....	.23
Mechanical, light colored.....	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

COTTON FABRICS

A slightly better tone in the wide industrial fabric and cotton duck markets was manifested toward the end of the period from July 16 to August 15. This followed the virtual inactivity of the markets during the major part of the period.

It is expected that buying will be stimulated by the present steady price undertone. The prices being obtained for the wide fabrics, after a steady decline during the early months of the year, have probably reached bottom and may move upward. Buying should also open up soon for the fall season, according to some observers.

Production of cotton ducks for the first quarter of 1954 declined almost 23%, as compared to production over the same period of 1953. This includes a 66.4% drop in the production of numbered duck (to 5,433,000 linear yards) and a 30% reduction in the output of Army duck (to 16,393,000 linear yards), according to statistics released by the Census Bureau. Drastic cutbacks in government procurement of these fabrics is given as the cause of this decline, although the decrease does follow a pattern begun in the second quarter of 1953.

Hose and belting duck output increased, however, by some 670,000 linear yards, as compared to production during the first quarter of 1953.

Two price changes were recorded over the period; 2.11-yard osnaburgs decreased ¼-½¢ a yard, and 53-inch sateens dropped ¼¢ a yard. Selling prices of these and other fabrics, f.o.b. shipping point, were as follows on August 15:

Cotton Fabrics

Drills

59-inch 1.85-yd.	yd.	$0.35
2.25-yd.		.30

Osnaburgs

40-inch 2.11-yd.	yd.	.235 / $0.2375
3.65-yd.		.1525/ .155

Ducks

38-inch 1.78-yd. S. F.	yd.	nom.
2.00-yd. D. F.		.33½
51.5-inch, 1.35-yd. S. F.		.49½
Hose and belting		.67

Raincoat Fabrics

Printcloth, 38½-inch, 64x60, 5.35-yd.	yd.	.135 / .1375
6.25-yd.		.11½/ .1175
Sheeting, 48-inch, 4.17-yd.		.20
52-inch, 3.85-yd.		.21 / .2125

Chafer Fabrics

14.30-oz./sq. yd. Pl.	lb.	.73
11.65-oz./sq. yd. S.		.65
10.80-oz./sq. yd. S.		.6875
8.9-oz./sq. yd. S.		.70

Other Fabrics

Headlining, 59-inch, 1.65-yd., 2-ply	yd.	.465
64-inch, 1.25-yd., 2-ply		.60
Sateens, 53-inch, 1.32-yd.		.535 / .54
58-inch, 1.21-yd		.59

RAYON

The most important event to occur in the rayon market over the past month was the commercial introduction of an extra-strong high-tenacity rayon tire yarn of 1650 denier by North American Rayon Corp. Selling price of the super high-tenacity yarn will be 64¢ a pound, or 3¢ a pound above the company's regular high-tenacity material. It is expected that this new tire yarn will be directly competitive with du Pont's Super Cordura, now selling at 67¢ a pound. Observers believe that the price of the du Pont product will be reduced if the rubber industry accepts the new yarn. It is also noted that other producers of high-tenacity rayon are experimenting with a "super" yarn, another factor which may eventually influence the price of these yarns.

Total shipments of rayon yarn by domestic producers in July totaled 86,900,000 pounds, a decrease of 8% under June figures and 19% below July, 1953, shipments. Total production during July was 91,100,000 pounds, or 15% under June production; and month-end stocks came to 99,200,000 pounds, more than 4% above June's level.

Viscose high-tenacity rayon yarn figures for July were as follows: calculated production, 23,200,000 pounds (almost 12% below June's total); total shipments, 20,900,000 pounds (15% under June); and end-of month stocks, 16,700,000 pounds (close to 13% above the June level).

No changes were made in rayon tire yarn and fabric prices during the period from July 16 to August 15.

Rayon Prices

Tire Yarns

High Tenacity		
1100/ 480	$0.62	/ $0.63
1100/ 490	.62	
1150/ 490	.62	
1165/ 480	.63	
1230/ 490	.62	
1650/ 720	.61	
1650/ 980	.61	
1875/ 980	.61	
2200/ 960	.60	
2200/ 980	.60	
2200/1466	.67	
4400/2934	.63	
Super High Tenacity		
1650/ 720	.64	/ .67

Tire Fabrics

1100/490/2	.72	
1650/980/2	.659	/ .73
2200/980/2	.685	

Financial

(Continued from page 832)

Columbian Carbon Co., New York, N. Y. Six months ended June 30, 1954: net income, $2,486,348, equal to $1.54 a share, against $2,593,173, or $1.61 a share, in the 1953 months.

National Lead Co., New York, N. Y. Six months to June 30, 1954: net profit, $17,569,659, equal to $1.46 a share, compared with $13,807,715, or $1.16 a share, in the corresponding months last year.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. Initial half, 1954: net earnings, $9,990,738, equal to $4.05 each on 2,399,617 common shares, against $10,845,200, or $4.41 each on 2,394,879 shares, in the like period last year; net sales, $194,729,331, against $202,550,961.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. First half, 1954: net profit, $37,918,723, equal to $2.59 each on 14,636,099 shares, against $34,224,846, or $2.34 each on 14,595,341 shares, in last year's half.

United States Rubber Statistics — May, 1954

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber and latex, total	0	55,983	55,983	51,398	355	104,377
Rubber, total	0	52,177	52,177	45,429	355	95,470
Latex, total	0	3,806	3,806	5,969	0	8,907
Synthetic rubbers, total	*39,650 †6,904	1,052	47,606	52,928	2,727	167,583
GR-S types*	*35,117 †116	1,004	36,237	41,474	1,115	131,604
Butyl	*4,533	48	4,581	5,602	373	20,077
Neoprene‡	†4,828	0	4,828	4,486	844	11,467
Nitrile type‡	†1,960	0	1,960	1,366	395	4,435
Natural rubber and latex, and synthetic rubbers, total	46,584	57,035	103,589	104,326	3,082	271,960
Reclaimed rubber, total	21,184	132	21,316	20,536	1,071	31,105
GRAND TOTALS	67,738	57,167	124,905	124,862	4,153	303,065

*Government plant production.
†Private plant production.
‡Include latices.
SOURCE: Chemical & Rubber Division, BDSA, United States Department of Commerce, Washington, D. C.

Estimated Pneumatic Casings, Tubes, and Camelback Shipments, Production, Inventory: June, May, 1954; June, 1953; First Six Months 1954, 1953

Passenger Casings	Original Equipment	Replacement	Export	Total	Production	Inventory
June, 1954	2,587,053	5,326,078	89,255	8,002,386	7,755,186	12,322,708
Change from previous month				+9.63%	+11.03%	−2.01%
May, 1954	2,695,389	4,503,068	101,164	7,299,621	6,984,582	12,575,264
June, 1953	3,216,161	4,819,656	75,498	8,111,315	7,325,378	12,896,337
First half, 1954	15,748,560	24,289,443	448,970	40,486,973	39,852,109	12,322,708
1953	17,691,610	24,841,208	297,378	42,830,196	44,410,829	12,896,337
Change, June, '54–'53	−19.56%	+10.51%			+5.87%	−4.45%
Truck and Bus Casings						
June, 1954	302,520	703,195	70,600	1,076,315	1,040,728	2,895,156
Change from previous month				+5.57%	+6.15%	−1.13%
May, 1954	324,171	612,351	83,009	1,019,531	980,413	2,928,289
June, 1953	320,361	781,578	66,316	1,168,255	1,261,872	3,409,052
First half, 1954	1,979,614	3,690,584	422,028	6,092,226	6,295,558	2,895,156
1953	2,676,454	4,722,896	354,277	7,753,627	8,313,605	3,409,052
Change, June, '54–'53	−5.57%	−10.03%			−17.53%	−15.08%
Total Automotive Casings						
June, 1954	2,889,573	6,029,273	159,855	9,078,701	8,795,914	15,217,864
Change from previous month				+9.13%	+10.43%	−1.84%
May, 1954	3,019,560	5,115,419	184,173	8,319,152	7,964,995	15,503,553
June, 1953	3,536,522	5,601,234	141,814	9,279,570	8,587,250	16,305,389
First half, 1954	17,728,174	27,980,027	870,998	46,579,199	46,147,667	15,217,864
1953	20,360,064	29,564,104	651,655	50,583,823	52,724,434	16,305,389
Tractor-Implement Casings						
June, 1954	159,260	129,817	9,977	299,054	309,852	666,654
Change from previous month				+0.99%	−2.46%	+2.29%
May, 1954	176,301	114,362	5,470	296,133	317,675	651,755
June, 1953	219,183	132,448	5,341	356,972	337,752	781,761
First half, 1954	1,067,215	772,942	40,105	1,880,262	1,703,267	666,654
1953	1,630,996	804,899	31,788	2,467,683	2,354,948	781,761
Passenger, Motorcycle, Truck and Bus Inner Tubes						
June, 1954	2,888,990	3,657,279	84,659	6,630,928	5,738,554	10,379,161
Change from previous month				+10.48%	−2.88%	−7.08%
May, 1954	3,017,308	2,900,378	84,345	6,002,031	5,908,880	11,170,315
June, 1953	3,537,469	3,291,430	70,798	6,899,697	7,011,373	12,903,667
First half, 1954	17,724,245	18,901,651	471,864	37,097,760	35,603,528	10,379,161
1953	20,373,418	20,067,378	353,011	40,793,807	41,669,483	12,903,667
Change, June, '54–'53	−18.33%	+11.12%			−18.15%	−19.57%
Camelback (Lbs.)						
June, 1954	—	23,441,552	593,585	24,035,137	26,078,165	27,758,521
Change from previous month				+8.48%	+13.29%	+7.05%
May, 1954	—	21,669,873	486,570	22,156,443	23,018,008	25,929,234
June, 1954	—	21,427,840	508,480	21,936,320	22,209,600	33,953,920
First half, 1954	—	126,238,401	4,437,775	130,676,176	132,506,372	27,758,521
1953	—	122,653,440	4,094,820	126,748,160	137,280,640	33,953,920

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

HYDROCARBON
PANAREZ
RESINS

3-210 AND 6-210
OUTSTANDING
RUBBER COMPOUNDING RESINS

PROPERTIES
- Low Specific Gravity
- Low Odor
- Uniform Quality
- Improves Processing
- No Effect on Cure
- Light Color

FOR
- Better Flex Life
- Improved Abrasion Resistance
- Maximum Extrusion Rate
- Improved Ozone Resistance
- Excellent Electrical Characteristics

EXCELLENT COMPATIBILITY with
- Natural Rubbers
- General Purpose GRS
- Cold Rubber GRS
- Buna N Type Rubbers
- Butyl Rubber

PANAREZ	Specific Gravity	Color Barrett	Softening Point, °F
3-210	1.049	1	200-220
6-210	1.106	2	200-220

Flaked or Solid — Prompt Delivery — Unlimited Quantity

BEST — AND LOWEST COST, TOO!

PAN AMERICAN CHEMICALS

PAN AMERICAN *Chemicals*
DIVISION
Pan American Refining Corp.
122 EAST 42ND STREET · NEW YORK 17, N Y

COMPOUNDING INGREDIENTS*

THIS listing of "Compounding Ingredients" has been largely expanded from previous listings in RUBBER WORLD and closely follows the classification of chemicals as found in our book, "Compounding Ingredients for Rubber." Readers are referred to this source for identification of brand names.

Government synthetic rubbers are now included in this list as well as privately produced synthetic rubbers. Suppliers using an abbreviated chemical name for their product are grouped under the abbreviated designation; while product names not using the abbreviation are listed alphabetically; for example, du Pont's MBT is under the MBT group of accelerators; whereas Vanderbilt's Captax (another 2-mercaptobenzothiazole) can be found under the C's. All latex compounding ingredients are grouped under that classification, with some sub-classification according to the physical state of the products, that is, dispersions and emulsions.

Suppliers are requested to submit product additions and price changes promptly as they occur in order that we may make the listing of maximum service to our readers. Comments on the present listing and classifications are invited with a view toward facilitating location of specific items. EDITOR

Abrasives

Pumicestone, powdered	lb.	$0.025	$0.045
Rottenstone, domestic	lb.	.03	.04
Shelblast	ton	80.00	165.00

Accelerators

A-1 (Thiocarbanilide)	lb.	.50	.57
A-32	lb.	.66	.80
A-100	lb.	.52	.66
Accelerator 49	lb.	.53	.54
552	lb.	2.25	
808	lb.	.66	.68
833	lb.	1.17	1.19
Altax	lb.	.48	.50
Arazate	lb.	.66	.71
Beutene	lb.	.61	.66
Bismate	lb.	3.00	
B-J-F	lb.	.27	.32
Butasan	lb.	1.04	
Butazate	lb.	1.04	
Butyl Accelerator 21	lb.	.89	
Eight	lb.	1.10	1.35
Zimate	lb.	1.04	
Captax	lb.	.38	.40
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Diesterex X	lb.	.50	.57
DOTG (diorthotolylguanidine)			
Cyanamid	lb.	.57	.58
Du Pont	lb.	.57	.58
DPG (diphenylguanidine)			
Cyanamid	lb.	.48	.49
Monsanto	lb.	.48	.55
El-Sixty	lb.	.50	.57
Ethasan	lb.	1.04	
Ethazate	lb.	1.04	
Ethyl Thiurad	lb.	1.04	
Tuads	lb.	1.04	
Tuex	lb.	1.04	
Zimate	lb.	1.04	
Ethylac	lb.	.93	.95
Hepteen	lb.	.44	.50
Base	lb.	1.85	
Ledate	lb.	1.04	
MBT (2-mercaptobenzothiazole)			
Du Pont	lb.	.38	.40
Naugatuck	lb.	.38	.43
-XXX			
Cyanamid	lb.	.49	.51
MBTS (mercaptobenzothiazyl disulfide)			
Cyanamid	lb.	.48	.50
Du Pont	lb.	.48	.50
Naugatuck	lb.	.48	.53
-W			
Cyanamid	lb.	.53	.55
Mertax	lt.	.49	.56
Methasan	lb.	1.04	
Methazate	lb.	1.04	
Methyl Tuads	lb.	1.14	
Zimate	lb.	1.04	
Monex	lb.	1.14	
Mono-Thiurad	lb.	1.14	
Morflex	lb.	.65	.70
NOBS No. 1	lb.	.69	.71
Special	lb.	.79	.81
O-X-A-F	lb.	.49	.54
Pentex	lb.	1.04	
Flour	lb.	.21	
Permalux	lb.	2.17	
Phenex	lb.	.52	.59
Pip-Pip	lb.	2.07	
R-2 Crystals	lb.	4.35	
Rotax	lb.	.49	.51
RZ-50, -50B	lb.	1.00	
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Santocure	lb.	.69	.76
Selenacs	lb.	2.60	
SPDX-GH	lb.	.64	.69
GL	lb.	.95	
Tellurac	lb.	1.21	
Tepidone	lb.	.45	
Tetrone A	lb.	1.91	
Thiofide	lb.	.48	.55
S	lb.	.50	.57
Thionex	lb.	1.14	
Thiotax	lb.	.38	.45
Thiurad	lb.	1.14	
Thiuram E	lb.	1.04	
M	lb.	1.14	
Trimene	lb.	.56	.62
Base	lb.	1.03	1.10
Tuads	lb.	1.14	
Tuex	lb.	1.14	
Ultex	lb.	1.00	1.10
Unads	lb.	1.14	
Ureka Base	lb.	.66	.73
Vulcacure NB	lb.	.45	
ZB, ZE, ZM	lb.	.85	
Z-B-X	lb.	2.45	
Zenite	lb.	.48	.50
A	lb.	.49	.51
Special	lb.	.49	.51
Zetax	lb.	.49	.51
Zimate	lb.	1.04	

* Prices, in general, are f.o.b. works. Range indicates grade or quantity variations. No guarantee of these prices is made. Spot prices should be obtained from individual suppliers.

† For trade names, see Color—White, Zinc Oxides.

Accelerator-Activators, Inorganic

Lime, hydrated	ton	$10.00	$17.50
Litharge, comml.	lb.	.155	.165
Eagle, sublimed	lb.	.16	.161
National Lead, sublimed	lb.	.16	.161
Red lead, comml.	lb.	.165	.175
Eagle	lb.	.17	
National Lead	lb.	.17	.1725
White lead, carbonate	lb.	.165	.175
Eagle	lb.	.165	.175
National Lead	lb.	.165	.175
White lead, silicate	lb.	.155	.1875
Eagle	lb.	.175	.1925
National Lead	lb.	.155	.165
Zinc oxide, comml.†	lb.	.135	.1775

Accelerator-Activators, Organic

Aktone	lb.	.22	.23
Barak	lb.	.62	
Capital 170	lb.	.23	.265
171	lb.	.1075	.1425
700	lb.	.125	.16
705, 710	lb.	.13	.165
800	lb.	.09	.1075
801	lb.	.1175	.135
802	lb.	.1225	.14
Curade	lb.	.57	.59
D-B-A	lb.	1.95	
Emery 600	lb.	.1125	.1475
Groco 30	lb.	.1125	.1475
35	lb.	.1175	.1525
Guantal	lb.	.57	.64
Hyfac 400	lb.	.0825	.1075
430	lb.	.135	.16
431	lb.	.1575	.1825
Hystrene S-97	lb.	.18	.2025
T-45	lb.	.14	.1625
T-70	lb.	.15	.1725
Industrene	lb.	.11	.1375
B	lb.	.1075	.13
Laurex	lb.	.30	.33
MODX	lb.	.295	.345
NA-22	lt.	1.50	
Oleic acid, comml.	lb.	.13	.19
Emersol 210 Elaine	lb.	.13	.165
Groco 2, 4, 8, 18	lb.	.13	.165
Wilmar 110	lb.	.13	.165
Plastone	lb.	$0.27	$0.30
Polyac	lb.	1.65	
Ridacto	lb.	.25	.26
Seedline	lt.	.1485	.1705
Stearex Beads	lb.	.1488	.1588
Stearic acid			
Emersol 111	lb.	.11	.13
120	lb.	.11	.135
130	lb.	.1325	.1575
Groco 52	lb.	.1075	.125
Hydrogenated, rubber grade			
Groco	lb.	.09	.1075
Rufat 75	lb.	.0825	.1075
Single pressed, comml.	lb.	.1175	.135
Emersol 110	lb.	.10	.125
Groco 53	lb.	.1125	.13
Wilmar 253	lb.	.11	.135
Double pressed, comml.	lb.	.1225	.14
Groco 54	lb.	.1175	.135
Wilmar 254	lb.	.115	.14
Triple pressed, comml.	lb.	.145	.1625
Groco 55	lb.	.14	.1575
Wilmar 255	lb.	.1375	.1625
Sterene 60-R	lb.	.09	.1075
Tonox	lb.	.515	.605
Vulklor	lt.	.75	.95
Wilmar 434	lb.	.105	.14
Zinc stearate, comml.	lb.	.37	.42

Antioxidants

AgeBest A26	lb.	.18	.24
620-32B	lb.	.20	.26
716-30	lb.	.18	.24
1041-21	lb.	.165	.225
1293-22A	lb.	1.90	2.00
AgeRite Alba	lb.	2.35	2.45
Gel	lb.	.64	.66
H. P.	lb.	.72	.74
Hipar	lb.	.98	1.00
Powder	lb.	.52	.54
Resin	lb.	.75	.77
D	lb.	.52	.54
Spar	lb.	.52	.54
Stalite	lb.	.52	.54
S	lb.	.52	.54
White	lb.	1.45	1.55
Akroflex C	lb.	.72	.79
CD	lb.	.72	.74
Albasan	lb.	.69	.73
Allied AA-1144	lb.	.23	.24
AA-1177	lb.	.155	.165
Aminox	lb.	.52	.57
Antioxidant 2246	lb.	1.65	1.68
Antisol	lb.	.23	.24
Antisun	lb.	.15	.175
Antox	lb.	.52	.54
Aranox	lb.	3.25	
Betanox Special	lb.	.80	.85
B-L-E, -25	lb.	.52	.57
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.52	.57
Copper Inhibiter X-872-L	lb.	2.01	
D-B-P-C	lb.	.91	1.16
Flectol H	lb.	.52	.59
Flexamine	lb.	.72	.77
Heliozone	lb.	.26	.27
Ionol	lb.	.91	1.40
NBC	lb.	1.55	
Neozone A	lb.	.56	.58
D	lb.	.52	.54
Octamine	lb.	.52	.57
Perflectol	lb.	.61	.68
Polygard	lb.	.52	.57
Protector	lb.	.26	.31
Rio Resin	lb.	.60	.62
Santoflex 35	lb.	.72	.79
AW	lb.	.78	.85
B	lb.	.52	.59
BX	lb.	.63	.70
Santovar A	lb.	1.50	1.57
Santowhite Crystals, Powder	lb.	1.60	1.67
L	lb.	.52	.59
MK	lb.	1.29	1.36
Sharples Wax	lb.	.23	.28
Stabilite	lb.	.55	.59
Alba	lb.	.72	.79
L	lt.	.60	.64
White	lb.	.53	.62
Powder	lb.	.41	.47
Styphen I	lb.	.51	.55
Sunolite #100	lb.	.21	.23
#127	lb.	.17	.19
Sunproof -713	lb.	.25	.30
Improved	lb.	.25	.30
Jr.	lb.	.20	.25
Thermoflex A	lb.	.98	1.00
Tonox	lb.	.52	.57
Tysonite	lb.	.24	.2475
Velvapex 51-250	lb.	.40	
V-G-B	lb.	.70	.75
Wing-Stay S	lb.	.52	.61
Zenite	lb.	.33	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.235	
Pentachlorophenol	lb.	.21	.29
Resorcinol, technical	lb.	.775	.785
Zinc naphthenate, 8-10%	lb.	.245	.30

Blowing Agents

Ammonium bicarbonate	lb.	.065	.075
Carbonate	lb.	.23	.24
Blowing Agent CP- 975	lb.	.35	



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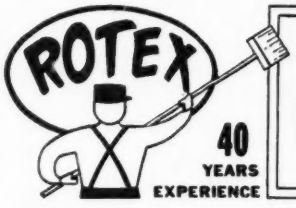
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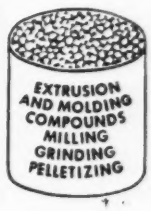
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Central Street QUALITY MOULDS FOR ALL PURPOSES South Easton, Mass.

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ALL TYPES OF FACTORY WASTE FOR RECLAIMING PURPOSES
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Celogen	lb.	$1.95	
50-C	lb.	1.01 /	$1.07
Sodium bicarbonate	100 lbs.	2.30 /	3.70
Carbonate, tech	100 lbs.	1.35 /	5.52
Sponge Paste	lb.	.20	
Unicel	lb.	.90	
ND	lb.	.79	
S	lb.	.20	

Bonding Agents

Braze	gal.	6.00 /	9.00
Cover cement	gal.	2.50 /	4.00
G-E Silicone Paste SS-15	lb.	4.52 /	5.10
SS-64	lb.	3.65 /	6.75
-67 Primer	lb.	7.50 /	12.50
Gen-Tac Latex	lb.	.75 /	.855
Kalabond Adhesive	gal.	6.50 /	16.00
Tie Cement	gal.	2.00 /	5.60
MDI	lb.	4.00 /	6.00
-50	lb.	2.00 /	3.00
Thixons	gal.	1.48 /	12.00
Ty Ply BN, Q, S, 3640	gal.	6.75 /	8.00

Brake Lining Saturants

BRT 3	lb.	.018 /	.0265
Resinex L-S	lb.	.0225/	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-40	lb.	.23 /	.30
Kosmos/Dixie BB	lb.	.23 /	.30
Spheron C	lb.	.14 /	.185
Voltex	lb.	.18 /	.315

Easy Processing Channel—EPC

Continental AA	lb.	.074 /	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074 /	.1225
Micronex W-6	lb.	.074 /	.1225
Spheron #9	lb.	.07 /	.1225
Texas E	lb.	.07 /	.1225
Witco #12	lb.	.074 /	.1225
Wyex	lb.	.074 /	.12

Hard Processing Channel—HPC

Continental F	lb.	.074 /	.1225
HX	lb.	.074 /	.12
Kosmobile S/Dixiedensed S	lb.	.074 /	.1225
Micronex Mk. II	lb.	.074 /	.1225
Spheron #4	lb.	.074 /	.1225
Witco #6	lb.	.074 /	.1225

Medium Processing Channel—MPC

Arrow TX	lb.	.074 /	.12
Continental A	lb.	.074 /	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.074 /	.1225
Micronex Standard	lb.	.074 /	.1225
Spheron #6	lb.	.074 /	.1225
Texas M	lb.	.07 /	.1225
Witco #1	lb.	.074 /	.1225

Conductive Furnace—CF

Aromex 115	lb.	.089 /	.129
Vulcan C	lb.	.105 /	.15
SC	lb.	.18 /	.223

Fast Extruding Furnace—FEF

Arovel	lb.	.06 /	.10
Continex FEF	lb.	.06 /	.10
Kosmos 50/Dixie 50	lb.	.06 /	.10
Statex M	lb.	.06 /	.10
Sterling SO	lb.	.0575/	.10

Fine Furnace—FF

Statex B	lb.	.065 /	.105
Sterling 99	lb.	.065 /	.105

High Abrasion Furnace—HAF

Aromex	lb.	.079 /	.125
Continex HAF	lb.	.079 /	.125
Kosmos 60/Dixie 60	lb.	.079 /	.1175
Philblack O	lb.	.079 /	.119
Statex R	lb.	.079 /	.125
Vulcan #3	lb.	.079 /	.125

Medium Abrasion Furnace—MAF

Philblack A	lb.	.06 /	.10

Super Abrasion Furnace—SAF

Kosmos 70/Dixie	lb.	.11 /	.155
Philblack E	lb.	.135 /	.175
I	lb.	.101 /	.145
Statex 125	lb.	.105 /	.15
Vulcan 6	lb.	.105 /	.15
9	lb.	.135 /	.178

General-Purpose Furnace—GPF

Sterling V	lb.	.05 /	.09
V Non-staining	lb.	.05 /	.09

High Modulus Furnace—HMF

Continex HMF	lb.	.055 /	.095
Kosmos 40/Dixie 40	lb.	.055 /	.095
Modulex	lb.	.055 /	.095
Statex 93	lb.	.0525/	.095
930	lb.	.047 /	.087
Sterling L, LL	lb.	.0525/	.095

‡ At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	$0.045 /	$0.085
Essex	lb.	.045 /	.085
Furnex	lb.	.045 /	.085
Gastex	lb.	.05 /	.09
Kosmos 20/Dixie 20	lb.	.045 /	.085
Pelletex, NS	lb.	.045 /	.085
Sterling NS, S, R	lb.	.045 /	.09

Fine Thermal—FT

P-33	lb.	.055	
Sterling FT	lb.	.055 /	.065

Medium Thermal—MT

Sterling MT	lb.	.035 /	.045
Non-staining	lb.	.045 /	.055
Thermax	lb.	.035	
Stainless	lb.	.045	

Chemical Stabilizers

Argus stabilizers	lb.	.60 /	1.38
Dutch Boy DS-207	lb.	.54	
Dyphos	lb.	.57	
Dythal	lb.	.395	
Normasal	lb.	.46	
Plumb-O-Sil A	lb.	.2975	
B	lb.	.3125	
C	lb.	.3425	
Tribase	lb.	.265	
E	lb.	.215	
Lead Stearate			
Mathe #30 fused	lb.	.32 /	.37
Oiled	lb.	.40 /	.45
P-30	lb.	.39 /	.44
#50	lb.	.53 /	.57
Witco #30	lb.	.32 /	.37
P-30	lb.	.29 /	.44
Mark M	lb.	.77 /	.91
XI	lb.	.87 /	1.01
XV	lb.	.92 /	1.01
XX	lb.	.63 /	.74
Stabelans	lb.	.60 /	1.70
Staycin 1	lb.	.65	
Stayrite #10	lb.	.32 /	.37
#15	lb.	.53 /	.57
#20	lb.	.37 /	.42
#22	lb.	1.40 /	1.44
#25	lb.	.35 /	.40
#70, 80, 90	lb.	.70	
P-10	lb.	.39 /	.44
Trenamine T-2039-B-1	lb.	.12	
Vanstay HT	lb.	.90 /	.92
L	lb.	.33 /	.35
S	lb.	.65 /	.70
White lead silicates, basic	lb.	.155 /	.1875
Eagle #201	lb.	.1825/	.1925
#202	lb.	.175 /	.185
National Lead	lb.	.155 /	.165

Colors

Black

Black Paste #25	lb.	.22 /	.40
Claremont vinyl paste	gal.	.45 /	.58
Covinylblaks	lb.	.68 /	.145
Iron oxides, comml.	lb.	.1275	
BK—Lansco	lb.	.1275/	.13
Williams	lb.	.1275/	.13
Lansco synthetic	lb.	.10	
Mapico	lb.	.1275/	.13
Lampblack, comml.	lb.	.16 /	.45
Superjet	lb.	.0825/	.1175
MB Mineral Blacks	lb.	.0315/	.0675
Stan-Tone	lb.	.45 /	1.20
Vansul masterbatch	lb.	.60 /	.65
Paste	lb.	.14 /	.15

Blue

Claremont vinyl pastes	gal.	.62 /	1.51
Du Pont	lb.	1.77 /	4.55
Filo	lb.	.28	
Heveatex pastes	lb.	.80 /	1.45
Lansco ultramarines	lb.	.25 /	.28
Monsanto Blue 7	lb.	1.55	
11	lb.	3.45	
DPB-283	lb.	1.93	
S-11	lb.	2.05	
Stan-Tone	lb.	1.55 /	1.60
Toners	lb.	.30 /	3.50
Vansul masterbatch	lb.	.90 /	2.70

Brown

Brown Paste #5, #10	lb.	.35 /	.45
Filo	lb.	.13	
Iron oxides, comml.	lb.	.1375/	.14
Claremont vinyl paste	gal.	.475 /	.495
Lansco synthetic	lb.	.125	
Mapico	lb.	.1375/	.14
Sienna, burnt, comml.	lb.	.0425/	.155
Williams	lb.	.11 /	.1725
Raw, comml.	lb.	.045 /	.1325
Williams	lb.	.08 /	.1725
Umber, burnt, comml.	lb.	.06 /	.07
Williams	lb.	.0675/	.08
Raw, comml.	lb.	.0625/	.07
Williams	lb.	.07 /	.0825
Williams			
Pure brown	lb.	.1375/	.14
Vandyke	lb.	.12	
Mapico Tan 20	lb.	.2025/	.205
Metallic brown	lb.	.04 /	.05
Plastics brown	lb.	.0625/	.07
Vansul masterbatch	lb.	2.10 /	2.20

Green

Chrome	lb.	.19 /	.50
Chrome oxide	lb.	$0.3925/	$1.10
G-4099, -6099	lb.	.3925/	.3975
GH-9869	lb.	1.00 /	1.15
9976	lb.	1.10 /	1.25
Claremont vinyl pastes	gal.	1.86 /	1.88
Du Pont	lb.	1.97 /	3.20
Filo	lb.	.40	
Heveatex pastes	lb.	.95 /	1.85
Lansco Toner	lb.	1.35	
Monsanto Green 3	lb.	2.75	
14	lb.	1.45	
17	lb.	3.95	
71205	lb.	1.35	
DGP	lb.	2.03	
S-17	lb.	2.25	
Stan-Tone	lb.	1.75 /	4.60
Toners	lb.	.35 /	4.00
Vansul masterbatch	lb.	2.00 /	2.60

Orange

Claremont vinyl pastes	gal.	.70 /	.72
Du Pont	lb.	2.75	
Monsanto Orange 68187	lb.	2.90	
Orange Paste #13	lb.	1.35 /	1.50
Stan-Tone	lb.	.70 /	3.35
Toners	lb.	.30 /	1.50
Vansul masterbatch	lb.	2.00 /	2.60

Red

Antimony trisulfide	lb.	.27 /	.30
R. M. P. No. 3	lb.	.72	
Sulfur Free	lb.	.78	
Cadmium red lithopone	lb.	1.64 /	2.05
Cadmolith	lb.	1.72 /	2.20
Claremont vinyl pastes	gal.	1.10 /	2.22
Du Pont	lb.	1.47 /	1.80
Filo	lb.	.11	
Indian Red	lb.	.1275	
Iron oxide, comml.	lb.	.06 /	.13
Claremont vinyl pastes	gal.	.44 /	.515
Lansco synthetic	lb.	.1175	
Mapico	lb.	.1275/	.13
Recco	lb.	.12	
Williams Red	lb.	.025 /	.095
Monsanto Red 7	lb.	1.55	
41	lb.	4.40	
3501	lb.	1.15	
4004	lb.	1.50	
69191	lb.	3.38	
Autumn	lb.	1.10	
PRP-285	lb.	1.27	
S-44	lb.	1.28	
Maroon 113	lb.	1.50	
61148	lb.	1.75	
Red Paste #17, I-2	lb.	.95 /	1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.05 /	4.05
Toners	lb.	.25 /	4.15
Tuscan	lb.	.15 /	.46
Vansul masterbatch	lb.	.95 /	3.30
Venetian	lb.	.035 /	.0625

White

Antimony oxide	lb.	.29 /	.305
Burgess Iceberg	ton	50.00 /	80.00
Claremont vinyl pastes	gal.	.45 /	.58
Lithopone, titanated	lb.	.10 /	.11
Cryptone BT	lb.	.10 /	.11
Permolith	lb.	.075 /	.085
Titanium pigments			
Rayox LW	lb.	.195 /	.205
R-110	lb.	.215 /	.225
Ti-Cal	lb.	.075 /	.0825
Ti-Pure	lb.	.195 /	.225
Titanox A, AA, A-168	lb.	.21 /	.22
C-50	lb.	.1225/	.1275
RA, -10, -50	lb.	.23 /	.24
RC	lb.	.0825/	.0875
-HT, -HTX	lb.	.08 /	.085
Zopaque Anatase	lb.	.225 /	.235
Rutile	lb.	.245 /	.255
Zinc oxide, comml.	lb.	.135 /	.1775
Azo ZZZ-11, -44, -55	lb.	.135 /	.145
20% leaded	lb.	.1375/	.1475
35% leaded	lb.	.14 /	.15
50% leaded	lb.	.14⅛ /	.15⅛
Eagle AAA, lead free	lb.	.135 /	.145
5% leaded	lb.	.135 /	.145
35% leaded	lb.	.14 /	.15
50% leaded	lb.	.14⅛ /	.15⅛
Florence Green Seal	lb.	.1525/	.1625
Red Seal	lb.	.1475/	.1575
White Seal	lb.	.1575/	.1675
Horsehead XX-4, -78	lb.	.135 /	.145
Kadox -15, -17, -22	lb.	.135 /	.145
-25	lb.	.1575/	.1675
Lehigh, 35% leaded	lb.	.14 /	.15
50% leaded	lb.	.14⅛ /	.15⅛
Protox-166, -167	lb.	.135 /	.145
St. Joe, lead free	lb.	.135 /	.145
Zinc sulfide, comml.	lb.	.253 /	.263
Cryptone ZS	lb.	.253 /	.263

Yellow

Cadmium yellow lithopone	lb.	1.15	
Cadmolith	lb.	1.12 /	1.20
Claremont vinyl pastes	gal.	.55 /	1.68
Chrome	lb.	.31	
Du Pont	lb.	1.80 /	2.15
Filo	lb.	.10	
Iron oxide, comml.	lb.	.0525/	.1075
Claremont vinyl paste	gal.	.44 /	.46
Lansco synthetic	lb.	.1075	
Mapico	lb.	.105 /	.1075
Williams	lb.	.105 /	.1075

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Requirements: Degree in Chemistry or Chemical Engineering. Up to 5 years' experience in rubber compounding development or production.

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Write giving age, experience and education. Replies held confidential. Employees know of this ad.

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RUBBER COMPOUNDER. COMPOUNDER WITH MINIMUM experience of five years in either belting, hose, tires, or molded rubber goods. Must be capable of developing new formulas and production follow-up on mixing, extrusion, and calendering. Write: GATES RUBBER COMPANY, Denver, Colorado.

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Well-established AAA-1 firm has exceptional opening for development chemist experienced in Natural and Synthetic Latices. Kindly state age, education, and experience. Address Box No. 1544, care of RUBBER WORLD.

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Established New England manufacturer of molded mechanical goods desires rubber technologist acquainted with broad field of synthetic elastomers. B.S. degree required with three years, minimum in compounding field. Should be capable of follow-up from production mixing through inspection. A combination of initiative and common sense essential. Send photograph along with résumé of experience and salary expected. Address Box No. 1545, care of RUBBER WORLD.

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Excellent opportunity for development chemist experienced with solvent-type rubber adhesives. Well-established, growing eastern concern. Address Box No. 1546, care of RUBBER WORLD.

RUBBER COMPOUNDER WANTED. POSITION AVAILABLE for an experienced rubber heel and sole compounder in medium-sized plant. Must have degree and several years' experience in rubber heel and sole industry. Direct all applications to the attention of Mr. Dale A. Dougherty, Comptroller, O'Sullivan Rubber Corporation. Winchester, Virginia.

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SMALL MECHANICAL GOODS PLANT LOCATED IN NEW York State has excellent permanent position, with opportunities for advancement for man 30-40 years of age, with technical and practical experience in rubber compounding and product development. Reply giving full particulars of experience and training, salary expected, education, etc. Address Box No. 1548, care of RUBBER WORLD.

RUBBER CHEMIST

With experience in sole and heel compounding, wanted by manufacturer in Middle Atlantic Area. Give personal information, education, and experience in first letter. Address Box No. 1549, care of RUBBER WORLD.

CHEMIST OR CHEMICAL ENGINEER FOR LATEX RESEARCH and development. Two or three years' Latex experience. Excellent opportunity for young man to grow with established and expanding organization making latex dipped goods. Location near New York. Reply outlining education, experience, and salary desired. Address Box No. 1550, care of RUBBER WORLD.

OUTSTANDING OPPORTUNITY FOR CHEMIST WITH 8-10 years' technical experience in phenolic resins and molding compounds. To take charge of research, development, quality, formulations, and staff. Excellent position for the right man. Replies held confidential. Address Box No. 1551, care of RUBBER WORLD.

SITUATIONS WANTED

RUBBER TECHNICIAN, WITH OVER 30 YEARS' EXPERIENCE in all phases of rubber manufacturing procedure, including compounding, milling, calendering, molding, and extruding hard and soft rubber parts, sponge rubber and some plastics, desires connection with reliable small- or medium-sized plant as Manager or Development Engineer. Eastern location preferred. Address Box No. 1552, care of RUBBER WORLD.

GERMAN RUBBER CHEMIST: GOOD TECHNICAL BACKground, excellent experience in the sale of raw materials to the rubber and plastics industries. Desires position as Sales Representative for Germany or Europe. Address Box No. 1553, care of RUBBER WORLD.

SITUATIONS WANTED (Continued)

CHEMICAL ENGINEER WITH 15 YEARS' MECHANICAL goods compounding and product development desires position with some travel that demands decisions based on experience and good judgment. Would consider foreign assignment. Address Box No. 1554, care of RUBBER WORLD.

PLANT MANAGER—PARTNER: GRADUATE CHEMICAL ENgineer, aged 35, with over 10 years' experience in compounding for the mechanical rubber industry, having at the same time top management responsibilities regarding labor and production, desires position with a progressive rubber company which will permit applicant to purchase substantial portion of firm. Address Box No. 1555, care of RUBBER WORLD.

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FOR SALE: FARREL 16" X 48" and 15" X 36", 2-ROLL RUBBER mills, and other sizes up to 84". Also new and used lab. 6" x 12" & 6" x 16" mixing mills and calenders. Six American Tool 300-gallon Churns. Extruders 1" to 6". Baker-Perkins Jacketed Mixers 100, 50, and 9 gals., heavy-duty double-arm, 350-ton upstroke Hydr. Press 22" x 24" platens. 325-ton upstroke 42" x 24" platens. Brunswick 200-ton 21" x 21" platens. Large stock of hydraulic presses from 12" x 12" to 48" x 48" platens from 50 to 2,000 tons. Hydraulic Pumps and Accumulators. Rotary Cutters, Stokes Automatic Molding Presses. Single Punch & Rotary Preform Machines, Banbury Mixers, Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107—8th St., Brooklyn 15, N. Y. STerling 8-1944.

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10010	lb.	1.91
BYP-282	lb.	1.21
GA	lb.	2.45
S-10010	lb.	1.17
Stan-Tone	lb.	1.00 / $1.55
Toners	lb.	.50 / 1.37
Vansul masterbatch	lb.	.95 / 1.95
Williams Ocher	lb.	.0525 / .055
Yellow D	lb.	1.25 / 1.35

Dusting Agents

Diatomaceous silica	ton	32.00 / 48.00
Extrud-o-Lube, cone	gal.	1.54 / 1.69
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Latex-Lube GR	lb.	.20
Pigmented	lb.	.1825
R-66	lb.	.165
Liqui-Lube	lb.	.1625
N. T.	lb.	.1675
Liquizinc No. 305	lb.	.30 / .35
Lubrex	lb.	.25 / .30
Mica Concord	lb.	.075 / .0825
Mineralite	ton	45.00
Pyrax A	ton	13.50
W. A.	ton	16.00
Snow Crest Talc	ton	33.00 / 35.00
Talc, commL	ton	14.00 / 38.50
EM	ton	11.00 / 63.00
L.S Silver	ton	29.25
Nypals	ton	25.00 / 36.00
Sagger 7	ton	34.00
Sierra white IR	ton	19.75
III	ton	20.75
Vantre	gal.	2.00 / 2.50

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BRS 700	lb.	.02 / .0285
BRT 7	lb.	.03 / .031
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Dielex B	lb.	.06
Factice, Amberex	lb.	.29 / .36
Brown	lb.	.1425 / .268
Neophax	lb.	.157 / .268
White	lb.	.144 / .285
G.B. Asphaltenes	lb.	.06 / .065
Millex, W	lb.	.07
Mineral Rubbers		
Black Diamond	ton	38.00 / 40.00
Hard Hydrocarbon	ton	46.50 / 48.50
Hydrocarbon MR	ton	45.00 / 55.00
Parmir	ton	21.00 / 29.00
T-MR Granulated	ton	47.50 / 50.00
Nuba No. 1, 2	lb.	.0575 / .0625
3X	lb.	.0775 / .0825
OPD-101	lb.	.26
Rubber substitute, brown	lb.	.122 / .22
Car-Bel-Ex A	lb.	.14
Car-Bel-Lite	lb.	.35
Extender 600	lb.	.1765
White	lb.	.148 / .256
Stan-Shells	ton	35.00 / 73.00
Synthetic 100	lb.	.41

Fillers, Inert

Agrashell flour	ton	50.00 / 74.00
Barytes, floated, white	ton	41.60 / 60.10
Off-color, domestic	ton	25.00
No. 1	ton	41.35 / 60.10
2	ton	39.35 / 58.00
Sparmite	ton	75.00 / 80.00
Blanc fixe	ton	100.00 / 165.00
Burgess Iceberg	ton	50.00 / 80.00
Pigment #20	ton	35.00 / 60.00
#30	ton	37.00 / 60.00
HC-75	ton	12.00 / 30.00
HC-80	ton	14.00 / 32.00
WP #1	ton	11.00 / 16.00
Cary #200	ton	30.00 / 55.00
Citrus seed meal	lb.	.04
Oil	lb.	.15
Clays		
Aiken	ton	14.00
Albacar	ton	50.00 / 55.00
Aluminum Flake	ton	20.00 / 60.00
#5	ton	23.50 / 30.00
Champion	ton	14.00
Crown	ton	14.00 / 33.00
Dixie	ton	14.00
Franklin	ton	13.50 / 35.25
GK Soft Clay	ton	11.00
Hi-White R	ton	13.50
Hydratex R	ton	28.00
Kaolloid	ton	10.50
Paragon	ton	13.50 / 31.50
McNamee	ton	13.50
RX-43	ton	33.00
Recco	ton	14.00
Sno-Brite	ton	12.50
Stan-Clay	ton	28.00
Stellar-R	ton	50.00
Suprex	ton	14.00 / 32.00
Swanee	ton	12.50
W-1291 English	ton	53.00 / 55.00
Windsor	ton	14.00 / 30.00
Witco #1	ton	14.00 / 30.00
#2	ton	13.50 / 30.00
Cryptone BA, CB, MS	lb.	.08 / .0825
Diatomaceous silica	ton	32.00 / 48.00
Flocks		
Cotton, dark	lb.	.095 / .135
Dyed	lb.	.55 / .60
White	lb.	.13 / .33
Fabrifil X-24-G	lb.	.135
X-24-W	lb.	.235
Filfloc 6000	lb.	$0.33
F-40-900	lb.	.135
Kalite	ton	50.00 / $65.00
Lithopone, commL	lb.	.075 / .085
Albalith	lb.	.075 / .085
Astrolith	lb.	.0675 / .0675
Eagle	lb.	.0725 / .075
Sunolith	lb.	.075 / .0825
Mica Concord	lb.	.075 / .0825
Millical	ton	35.00 / 50.00
Mineralite	ton	40.00 / 60.00
No. 1 Silica	ton	22.00 / 40.00
Non-Fer-Al	ton	30.00 / 45.00
Purecal	ton	56.75 / 71.75
Pyrax A	ton	13.50
W. A.	ton	16.00
Sawdust	ton	14.00 / 33.00
SL Slate Flour	ton	17.00 / 25.00
Stan-White	ton	8.50 / 9.45
Super-White Silica	ton	23.00 / 43.00
Suspenso	ton	33.00 / 48.00
Terra Alba 1319	ton	27.00
Ti-Cal	lb.	.0675
Whiting, limestone	ton	32.00 / 34.00
Atomite	ton	30.00
Calcite	ton	21.50
Keystone	ton	16.00
Paxinosa	ton	10.00 / 18.00
Snowflake	ton	17.00 / 18.00
Stonelite	ton	9.00
Witco	ton	8.50
York	ton	9.50

Finishes

Apex Bright Finish #5200-E	lb.	.25
Rubber Finish	gal.	2.50
Black-out	gal.	4.50 / 8.00
Flocks		
Rayon, colored	lb.	.90 / 1.50
White	lb.	.75 / 1.25
Also see Flocks, under Fillers, Inert		
Rubber lacquer, clear	gal.	1.00 / 2.00
Colored	gal.	2.00 / 3.50
Shellacs, Angelo	lb.	.385 / .7325
Vac Dry	lb.	.385 / .57
Shoe varnish	gal.	1.45
Talc (*See Talc under Dusting Agents*)		
Unidip	lb.	.15 / .20
Wax, Bees	lb.	.55 / .75
Carnauba	lb.	.79 / 1.15
Montan	lb.	.135 / .32
No. 118, colors	gal.	.86 / 1.41
Neutral	gal.	.76 / 1.31
Van Wax	gal.	1.45 / 1.50

Latex Compounding Ingredients

Acintol D, DLR	lb.	.06 / .075
FA #1	lb.	.065 / .08
#2	lb.	.075 / .09
Accelerator 552	lb.	2.25
J-117, -302	lb.	1.00 / 1.15
-144	lb.	.15 / .30
-307	lb.	1.10 / 1.25
-311	lb.	.60 / .75
Aersol, dry types	lb.	.39 / 1.20
Liquid types	lb.	.40 / .72
Alcogum AN-6	lb.	.05
AN-10	lb.	.085
Alrosol	lb.	.41
Alrowet D-75	lb.	.63
Amberex solutions	lb.	.1675 / .18
Antifoam J-114	lb.	3.25 / 3.45
P-242	lb.	.24 / .35
Antioxidant J-137, -140	lb.	.55 / .70
-139, -293	lb.	1.45 / 1.60
-182	lb.	2.00 / 2.15
-186	lb.	1.40 / 1.55
2246	lb.	1.65 / 1.68
Anti-Webbing Agent J-183	lb.	.75 / .90
-297	lb.	.27 / .40
Aquablak B	lb.	.0925 / .0975
G	lb.	.105 / .11
K	lb.	.1075 / .1125
M	lb.	.085 / .09
Aquarex D	lb.	.78
G	lb.	.21
L, ME	lb.	.94
MDL	lb.	.33
NS	lb.	.60
SMO	lb.	.50
WAQ	lb.	.25
Areskap 50	lb.	.30 / .38
100, dry	lb.	.60 / .72
Aresket 240	lb.	.30 / .38
300, dry	lb.	.60 / .72
Aresklene 375	lb.	.42 / .57
Ben-A-Gels	lb.	.98 / 1.40
Bentone 18, 18C	lb.	.45
34	lb.	.60
Casein	lb.	.22
Cellosize WP-09, -3, -300	lb.	1.36 / 1.60
Coagulant P-379	gal.	1.30 / 1.90
-392	gal.	1.55 / 2.15
CW-12	lb.	.85
37	lb.	.70
Defoama W-1701	lb.	.125
Dispersing Agents		
Blancol	lb.	.1525 / .26
N	lb.	.155 / .26
Darvan Nos. 1, 2, 3	lb.	.22 / .30
Daxad 11, 21, 23, 27	lb.	.08 / .30
Emulphor ON-870	lb.	.50 / .70
Igepal CO-630	lb.	.2875 / .47
Igepon T-73	lb.	.285 / .495
T-77	lb.	.45 / .69
Indulins	lb.	.06 / .08
Kreelons	lb.	.132 / .155
Laurelton Oil	lb.	.18
Leonil SA	lb.	$0.52 / $0.65
Lomar PW	lb.	.18
Marasperse CB	lb.	.1225 / .1425
N	lb.	.095 / .105
Modicols	lb.	.17 / .58
Nekal BA-75	lb.	.395 / .54
BX-76	lb.	.63 / .75
Pluronics	lb.	.335 / .40
Polyfons	lb.	.08 / .09
Sorapon SF-78	lb.	.28 / .40
Tergitol NPX	lb.	.275 / .3074
TMN	lb.	.2875 / .32
7	lb.	.4125 / .44
Trenamine	lb.	.15
Triton R-100	lb.	.12 / .25
Dispersions		
AgeRite Alba	lb.	3.00
Powder, Resin D	lb.	.80
White	lb.	1.80
Altax	lb.	.75
Black No. 25	lb.	.22
Black Shield Nos. 2, 6	lb.	.08
3	lb.	.095
4-35	lb.	.09
5	lb.	.093
7-F, 8	lb.	.165
55	lb.	.18
Iron oxide, 60%	lb.	.40
L.S.W.	lb.	1.50
P-33	lb.	.35
Rayox	lb.	.45
Rotax	lb.	.75
Sulfur	lb.	.12 / .30
No. 2	lb.	.14 / .16
Telloy	lb.	3.00
Tuads, Methyl	lb.	1.60
Vulcanizing		
C group	lb.	.40 / 1.30
G group	lb.	.45 / .90
N group	lb.	.40 / 1.00
Zetax	lb.	.75
Zimates, Butyl	lb.	1.30
Ethyl, Methyl	lb.	1.35
Zinc oxide	lb.	.40
Emulsions		
AgeRite Stalite	lb.	.75
Habuco Resin Nos. 502, 515, 523	lb.	.195 / .20
503	lb.	.22 / .225
504, 526	lb.	.19 / .195
517	lb.	.175 / .18
524	lb.	.155 / .16
Resin A-2	lb.	.16 / .25
P-370	lb.	.175 / .25
X-210	lb.	.12 / .22
Gelling Agent P-397	lb.	.34 / .37
Igepon T-43	lb.	.145 / .35
T-51	lb.	.125 / .285
-73	lb.	.285 / .495
Indulins	lb.	.06 / .08
Laton L	lb.	.075 / .0775
Ludox	lb.	.1675 / .1925
Marmix	lb.	.41 / .48
Merac	lb.	.75 / 1.05
Micronex, colloidal	lb.	.06 / .07
Monsanto Blue 4685 WD	lb.	1.60
Green 4884 WD	lb.	1.80
Red 127	lb.	1.25
OPD-101	lb.	.16 / .26
Pliolite Latex 150, 190	lb.	.32 / .41
170	lb.	.37 / .46
Polyvinyl methyl ether	lb.	.25 / .45
Resin V	lb.	.13
Santomerse D	lb.	.44 / .65
S	lb.	.13 / .25
Sellogen Gel	lb.	.1275
Sequestrene AA	lb.	.905 / .975
30A	lb.	.245 / .265
ST	lb.	.585 / .615
Setsit #5	lb.	.75 / 1.05
Stablex A	lb.	.80 / 1.10
B, G	lb.	.50 / .95
K	lb.	.27 / .35
P	lb.	.35 / .50
T	lb.	.14 / .22
Webnix	lb.	1.50 / 2.50

Mold Lubricants

Acintol D	lb.	.06 / .075
Alipal CO-433	lb.	.25 / .45
CO-436	lb.	.22 / .41
Aquarex Compounds	lb.	.28 / .97
Carbowax 200, 300, 400	lb.	.22 / .25
1500	lb.	.255 / .2825
4000	lb.	.31 / .32
6000	lb.	.35 / .36
Colite Concentrate	gal.	.90 / 1.15
ELA	lb.	.82
DC Mold Release Fluid Emulsion Nos. 35, 35A, 35B	lb.	4.14 / 6.00
DC7	lb.	6.20 / 6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48 / 1.63
Igepals	lb.	.2875 / .47
Igepon AP-78	lb.	.44 / .68
T-43	lb.	.145 / .35
T-51	lb.	.125 / .285
T-73	lb.	.285 / .495
Lubrex	lb.	.25 / .30
Lubri-Flo	gal.	10.00 / 12.05
Lustermold	lb.	.41
Mold Paste	lb.	.25
Monopole Oil	lb.	.16
Monten Wax	lb.	.57
Para Lube	lb.	.046 / .048
Pluronics	lb.	.335 / .44
Polyglycol E series	lb.	.29 / .42
Rubber-Glo	gal.	.94 / .97

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE (Continued)

RUBBER MACHINERY FOR SALE

CALENDER: FARREL, 3-ROLL, 18"x54" take-off rolls; West. thruster brake; 75 H.P. motor; gear reducer.
LIFT TABLES: 1—w/controls & Peerless 3 H.P. 220/440 motor & pump. 1—w/5 H.P. GE motor & rotopump, 40 gals. per min. I. Rand Hydraulic Table for B. Southwark 400-ton press, 32"x32". 4—WATER-COOLED HEATING OR COOLING TABLES: 36"x36"x1¼" thick.
GRINDERS—ROBINSON 50 H.P. STOCK TYPE: 3/60/220; water-cooled revolving disk direct mounted on motor shaft; new & late design.
MILL—FARREL. 22"x60", 2-ROLL; anti-friction-type bearings; gear reducer, 125 H.P. Syn. motor; latest design cabinet, auto. control; NOW RUNNING: 12" necks; excellent condition.
PRESSES: 450-T. SHERIDAN 4-POST HYDRAULIC: new '44; self-cont'd., upper platen 48x26"; lower 48x26"; stroke 12⅜". 400-T. BALDWIN SOUTHWARK LAMINATING: new '46; bed 32x32", 8 openings; slab sided; latest design 24" ram; 26" stroke. 100-T. FARREL HYDRAULIC: 5 platens, 35"x36"x3¼" tie rods.
TOLEDO CONTINUOUS WEIGHING SCALE: weighs any type of rubber goods; travel over scale approx. 6" lgth.
EVEREADY SUPPLY CO. BRIDGEPORT, CONNECTICUT
805 HOUSATONIC AVENUE TEL. EDison 4-9471-2

3 DOUBLE-LENGTH AMERICAN TOOL SPREADERS, VERY good condition, motorized, 3 speeds, 64-inch width. 3 embossing machines—2-kid grain, 1 skiver—will emboss 72-inch material. 1 starch box 53" wide—all good brushes. W. J. DUNN, MOHAWK BACKING CO., INC., 340 Harter Street, Herkimer, N. Y.

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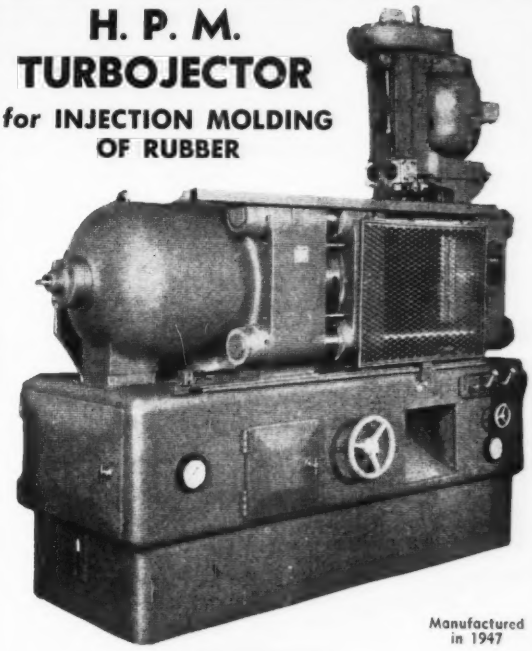
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for INJECTION MOLDING OF RUBBER



Manufactured in 1947

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450 Ton Mold Clamp Capacity. Mold space Horizontal and Vertical 21½" x 28". Clearance between Tie Rods 21½" x 16¼". Daylight 28½". Screw Speeds 82 to 144 RPM. Motor Clamp HP 10. Motor Screw HP 15.

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Designers and Builders of
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UNITED RUBBER MACHINERY EXCHANGE
183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

Soap, Hawkeye	lb.	$1.35 /	$1.45
Purity	lb.	.155 /	.165
Sodium stearate	lb.	0.40	
Stoner's 700 series	gal.	1.20 /	1.25
800 series	gal.	1.26 /	1.70
900 Series	gal.	1.55 /	2.55
A Series	gal.	1.80 /	4.50
Ucon 50-HB Series	lb.	.25 /	.375
LB Series	gal.	2.18 /	3.04
Ulco	lb.	.12 /	.23
Vanire	gal.	2.50 /	3.00

Odorants

Alamasks	lb.	.75 /	6.50
Coumarin	lb.	2.95 /	3.55
Curodex 19	lb.	4.75 /	5.05
188	lb.	5.75	
198	lb.	6.75	
Ethavan	lb.	6.75 /	7.35
Latex Perfume #7	lb.	4.00	
Neutroleum Gamma	lb.	3.60	
Rubber Perfume #10	lb.	2.60	
Vanillin, Monsanto	lb.	3.00 /	3.15

Plasticizers and Softeners

Acintol R	lb.	.065 /	.07
Adipol 2EH, 10A	lb.	.435 /	.465
BCA	lb.	.45 /	.475
ODY	lb.	.48 /	.51
Akroflex C	lb.	.695 /	.715
Aro Lene #1980	lb.	.10 /	.12
Baker AA Oil	lb.	.195 /	.24
Crystal O Oil	lb.	.21 /	.255
Processed oils	lb.	.215 /	.235
Bardol, 639	lb.	.215 /	.235
B	lb.	.0625/	.065
Bondogen	lb.	.55 /	.60
BRC 20	lb.	.15 /	.175
22	lb.	.025 /	.0275
30	lb.	.0125/	.021
521	lb.	.019 /	.02
BRH 2	lb.	.0213/	.0351
BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
BRV	lb.	.0475/	.0565
Bunarex Liquid	lb.	.0425/	.0555
Resins	lb.	.065 /	.1225
Bunnatol G. S.	lb.	.40 /	.505
Butac	lb.	.125 /	.135
Butyl stearate, comml	lb.	.24 /	.27
Binney & Smith	lb.	.23 /	.26
Hardesty	lb.	.23 /	.26
BxDC	lb.	.40 /	.41
Cabol 100	lb.	.02 /	.06
Califlux 510, 550	lb.	.025 /	.0325
G. P.	lb.	.0125 /	.02
R-100	lb.	.045 /	.0525
TT	lb.	.017 /	.0245
Capryl alcohol, comml	lb.	.18 /	.20
Binney & Smith	lb.	.18 /	.28
Hardesty	lb.	.18 /	.28
Chlorowax 40	lb.	.145 /	.225
70	lb.	.18 /	.24
-S	lb.	.21 /	.27
Contogums	lb.	.0875/	.111
Cumar Resins	lb.	.065 /	.17
DBM (di butyl-m-cresol) Darex	lb.	.32 /	.3475
DBP (di butyl phthalate), comml	lb.	.30 /	.33
Darex	lb.	.30 /	.33
Monsanto	lb.	.30 /	.33
Rubber Corp. of America	lb.	.30 /	.44
Sherwin-Williams	lb.	.30 /	.33
DBS (di butyl sebacate), comml	lb.	.66 /	.69
Monoplex	lb.	.66 /	.675
DCP (di capryl phthalate), comml	lb.	.30 /	.33
Monoplex	lb.	.30 /	.315
DDA (di decyl adipate) Cabflex	lb.	.435 /	.465
DDP (di decyl phthalate) Cabflex	lb.	.32 /	.35
Defoamer X-3	lb.	.355	
DIBA (di iso butyl adipate) Cabflex Di-BA	lb.	.4325/	.4625
Darex	lb.	.4325/	.4625
DIDA (di iso decyl adipate) Monsanto	lb.	.435 /	.465
DIDP (di iso decyl phthalate) Darex	lb.	.32 /	.35
Monsanto	lb.	.32 /	.35
Dielex B	lb.	.06	
Diethylene glycol, comml	lb.	.1325/	.16
Wyandotte	lb.	.15 /	.16
Dinopols	lb.	.32 /	.365
DIOA (di iso octyl adipate) Cabflex Di-OA	lb.	.435 /	.465
Rubber Corp. of America	lb.	.435 /	.57
DIOP (di iso octyl phthalate), comml	lb.	.32 /	.34
Cabflex Di-OP	lb.	.32 /	.35
Darex	lb.	.32 /	.35
Monsanto	lb.	.32 /	.35
Rubber Corp. of America	lb.	.32 /	.45
Sherwin-Williams	lb.	.32 /	.34
DIOS (di iso octyl sebacate), comml	lb.	.61 /	.64
Rubber Corp. of America	lb.	.64 /	.84
DIOZ (di iso octyl azelate) Cabflex Di-OZ	lb.	.48 /	.5075
Dipolymer Oil	gal.	.33 /	.38
Dispersing Oil No. 10	lb.	.06 /	.0625
DNODP (di-n-octyl-n-decyl phthalate) Monsanto	lb.	.335 /	.365
DOA (di octyl adipate), comml	lb.	$0.435 /	$0.465
Cabflex	lb.	.435 /	.465
Monsanto	lb.	.435 /	.465
Rubber Corp. of America	lb.	.435 /	.57
DOP (di octyl phthalate), comml	lb.	.34 /	.35
Cabflex	lb.	.32 /	.35
Darex	lb.	.32 /	.35
Monsanto	lb.	.32 /	.35
Rubber Corp. of America	lb.	.32 /	.45
Sherwin-Williams	lb.	.32 /	.34
DOS (di octyl sebacate), comml	lb.	.61 /	.64
Monoplex	lb.	.61 /	.635
Rubber Corp. of America	lb.	.64 /	.84
Duraplex C-50 LV, 100°C	lb.	.25 /	.295
Dutch Boy NL-A10 (DBP), -A-54	lb.	.30 /	.33
-A20 (DOP), A30 (DIOP)	lb.	.32 /	.35
-C20 (DOS)	lb.	.64 /	.66
-F21	lb.	.395 /	.425
-F31	lb.	.46 /	.49
-F41	lb.	.49 /	.52
Dutrex 6	lb.	.025 /	.035
Emulphor EL-719	lb.	.52 /	.73
Ethox	lb.	.43 /	.455
Ethylene glycol, comml	lb.	.115 /	.1425
Wyandotte	lb.	.1325/	.1425
Flexol 3 GH	lb.	.44 /	.46
3 GO	lb.	.53 /	.55
4 GO	lb.	.325 /	.355
TOF, A-26	lb.	.435 /	.465
Fortex	lb.	.125 /	.145
Galex W-100	lb.	.155 /	.18
W-100 D	lb.	.1525/	.1775
G. B. Asphaltic Flux	gal.	.08 /	.14
Naphthenic Neutrals	gal.	.11 /	.18
Process Oil Light	lb.	.025 /	.0325
Medium	lb.	.035 /	.0425
Gilsowax B	lb.	.09 /	.11
Good-rite GP-233	lb.	.435 /	.58
GP-261	lb.	.32 /	.47
Harchemex	lb.	.25 /	.34
Harflex 10	lb.	1.25 /	1.335
40	lb.	.66 /	.745
50, 80	lb.	.61 /	.695
60	lb.	.62 /	.705
90	lb.	.88 /	.965
120, 150	lb.	.32 /	.35
140, 160, 180	lb.	.30 /	.33
220	lb.	.435 /	.465
260	lb.	.42 /	.45
280	lb.	.43 /	.46
500	lb.	.315 /	.345
HB-20	lb.	.15 /	.17
-40	lb.	.22 /	.24
Heavy Resin Oil	lb.	.0225/	.0375
HSC-13	lb.	.27 /	.30
Indoil Compound 51-S	lb.	1.00 /	1.10
Indonex	gal.	.11 /	.19
Kapsol	lb.	.3225/	.3525
Kenflex A, L	lb.	.26 /	.27
B	lb.	.23 /	.24
N	lb.	.18 /	.19
Kessoflex 103	lb.	.405	
105	lb.	.3325	
106	lb.	.38	
107	lb.	.525	
110	lb.	.24	
111	lb.	.28	
KP-23	lb.	.29 /	.32
-90	lb.	.45 /	.48
-140	lb.	.46 /	.485
-201	lb.	.5825/	.5925
-220	lb.	.31 /	.34
-555	lb.	.45 /	.475
Kronisol	lb.	.33 /	.355
Kronitex AA, I	lb.	.33 /	.36
Marvinol plasticizers	lb.	.28 /	.8825
Methox	lb.	.385 /	.41
Monoplex S series	lb.	.215 /	.47
Morflex	lb.	.25 /	.65
Neoprene Peptizer P.-12	lb.	1.05	
Nevillac	lb.	.39 /	.85
Neville R Resins	lb.	.13 /	.35
Nevinol	lb.	.20	
No. 1-D heavy oil	lb.	.065	
ODA (octyl decyl adipate) Cabflex	lb.	.435 /	.465
ODP (octyl decyl phthalate) Cabflex	lb.	.32 /	.35
Rubber Corp. of America	lb.	.32 /	.45
Ohopex R-9	lb.	.3525/	.3775
Q-10	lb.	.31 /	.34
Orthonitro benzophenol, comml	lb.	.13 /	.15
Monsanto	lb.	.13 /	.15
Palmalene	lb.	.15	
Paradene Resins	lb.	.065 /	.075
Paraflex BN-1	lb.	.185 /	.225
Para Flux, regular	gal.	.10 /	.2125
No. 2016	gal.	.165 /	.24
2332	gal.	.11	
4205	lb.	.1075 /	.2125
Para Lube	lb.	.046 /	.048
Resins	lb.	.04 /	.045
Paraplex S-B	lb.	.34 /	.4075
AL-111	lb.	.32 /	.3275
G-25	lb.	.80 /	.805
-40	lb.	.52 /	.525
-50	lb.	.4175/	.4375
-53	lb.	.465 /	.485
-60	lb.	.335 /	.355
-62	lb.	.36 /	.38
RG-7	lb.	.37 /	.375
-8	lb.	.565 /	.5725
-10	lb.	.56 /	.5675
Paradene Resins	lb.	$0.065 /	$0.075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.79 /	.82
Picco Resins	lb.	.13 /	.185
Aromatic Plasticizers	lb.	.048 /	.065
480 Oilproof Series	lb.	.18 /	.23
Liquid Resin D-165	lb.	.08 /	.095
S. O. S.	gal.	.29 /	.34
Piccocizers	lb.	.04 /	.07
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.12 /	.135
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Piccovol	lb.	.025 /	.038
Pictar	gal.	.25 /	.30
Pigmentar, American	lb.	.041 /	.0678
Sunny South	lb.	.0389/	.0678
Pigmentaroil, American	lb.	.041 /	.0678
Sunny South	lb.	.0389/	.0678
Pitch, Burgundy Sunny South	lb.	.098 /	.1025
Plasticizer 35	lb.	.205 /	.24
36	lb.	.305 /	.34
42	lb.	.34 /	.40
B	lb.	.35 /	.45
DP-520	lb.	.435 /	.455
MT-511	lb.	.535 /	.565
ODN	lb.	.32 /	.37
PX series	lb.	.385 /	.75
SC	lb.	.61 /	.69
Plastogen	lb.	.0775/	.08
Plastone	lb.	.22 /	.30
Polycizers	lb.	.40 /	.4775
PT67 Light Pine Oil	gal.	.60	
101 Pine Tar Oil	gal.	.335 /	.445
Pine Tars	gal.	.35 /	.46
R-19, R-21 Resins	lb.	.1075	
Reogen	lb.	.1325/	.135
Resin C pitch	lb.	.0225/	.031
R6-3	lb.	.38 /	.40
Resinex	lb.	.0325/	.0375
L-4	lb.	.0225/	.03
Rosin Oil, Sunny South	gal.	.58 /	.875
RPA No. 2	lb.	.78	
3	lb.	.47	
Conc.	lb.	.97	
5	lb.	.59	
RSN Flux	gal.	.10 /	.19
Rubber Oil B-5	lb.	.0225/	.0355
Rubberol	lb.	.2575/	.2725
Santicizer 1-H	lb.	.50 /	.51
3	lb.	.46 /	.47
8	lb.	.43 /	.44
9	lb.	.39 /	.42
140	lb.	.33 /	.46
141	lb.	.34 /	.37
160	lb.	.25 /	.28
601, 602	lb.	.32	
B-16	lb.	.4875/	.4975
E-15	lb.	.5075/	.5375
M-17	lb.	.4275/	.4575
Sebacic acid, purified, comml	lb.	.64 /	.70
Binney & Smith	lb.	.64 /	.76
Hardesty	lb.	.64 /	.76
C.P. Binney & Smith	lb.	.72 /	.84
Hardesty	lb.	.72 /	.84
Seedinr	lb.	.1485/	.1705
Sherolatum Petrolatum	lb.	.05 /	.10
Softener #20	gal.	.10 /	.20
Special Rubber Resin	100 lbs.	.1675/	.2175
Staflex AX	lb.	.43	
DBES	lb.	.61 /	.635
Starex Beads	lb.	.14⅞ /	.15⅞
Starite	lb.	.095 /	.10
Syn-Tac	gal.	.33 /	.35
Synthol	lb.	.2475	
Thiokol TP-90B	lb.	.59	
-95	lb.	.65	
TR-11	lb.	.035	
Tricresyl phosphate, comml	lb.	.33 /	.36
Monsanto	lb.	.33 /	.36
Triphenyl phosphate, comml	lb.	.39 /	.40
Monsanto	lb.	.39 /	.40
Turgum S	lb.	.1075/	.1175
Tysonite	lb.	.24 /	.2475
United	gal.	.69 /	1.20
X-1 Resinous Oil	lb.	.021 /	.0275
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Acintol C, P	lb.	.02 /	.03
Bardol, 639	lb.	.0275/	.0375
B	lb.	.0625/	.065
BRH 2	lb.	.0213/	.0351
BRT 3	lb.	.018 /	.0265
4	lb.	.025 /	.026
7	lb.	.03 /	.031
BRV	lb.	.0475/	.0565
Burco-RA	lb.	.053 /	.0805
BWH-1	lb.	.16 /	.18
Dipolymer Oil	gal.	.33 /	.43
Dispersing Oil No. 10	lb.	.06 /	.0625
G. B. Oils	gal.	.10 /	.24
Heavy Resin Oil	lb.	.0225/	.0375
LX-777	gal.	.23 /	.33
No. 1621	lb.	.025 /	.035
3186	gal.	.28 /	.295
Picco 6535	gal.	.25 /	.30
C-33	gal.	.215 /	.315
-42	gal.	.23 /	.33
D-4	gal.	.27 /	.37
E-5	gal.	.25 /	.35
Q-Oil	gal.	.286 /	.36
PT 67	gal.	.60	
101 Pine Tar Oil	gal.	.335 /	.445
150 Pine Solvent	gal.	.44	

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Continued

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FOR SALE: MONOBAND BICYCLE TIRE BUILDING MACHINE. Entirely automatic. Made by SHAW, 1948. Address Box No. 1559, care of RUBBER WORLD.

SURPLUS 2,394 POUNDS SE-51 GUM RUBBER SILICONE (FORMerly 81339) packaged in 40-pound original General Electric steel 5-gallon drums. Present market price $4.20 per pound. Offered at $3.50 per pound lot price. PACIFIC MOULDED PRODUCTS CO., 905 East 59th Street, Los Angeles 1, California.

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Mills - Spreaders - Churns
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Calenders

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I will invest up to $5,000 in rubber molds for the manufacture of any item which will stand careful scrutiny. GEORGE B. FARWELL, 1045 Sonoma Avenue, Menlo Park, Calif.

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To Your Specification

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1—Ambaco Model 3A Continuous Baler.
2—Thropp 2-roll Rubber Mills, 18"x50".
1—6' x 14' Vulcanizer, 90 psi. ASME.
1—Adamson Vulcanizer, 2' x 12' with quick opening door.
1—J. P. Devine Double Door Vacuum Shelf Dryer, 13 Shelves.
1—Buflovak Double Door Vacuum Shelf Dryer, 20 Shelves.
1—Devine Double Door Vacuum Shelf Dryer, 13 Shelves.
14—Baker Perkins Steel Jacketed Mixers—100 gals.—Type 15 JIM 2. Late type construction.
2—Buflovak Single Door Vacuum Shelf Dryers, 20 Shelves.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBBER machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers, etc. and also complete plants.

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STATE HIGHWAY No. 29, UNION, N.J.
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THE LANGUAGE OF THE RUBBER INDUSTRY SINCE 1915

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TECHNICAL DATA ON REQUEST

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We do milling and compounding of all types—black or color—master batches

All mixing done under careful supervision and laboratory control.

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Pequanoc Rubber Co.
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MAIN SALES OFFICE and FACTORY, BUTLER, N. J.

Reclaiming Oil #3186	gal.	$0.28 /	$0.385
-G	gal.	.25 /	.365
4039-M	gal.	.3275 /	.3975
-V	gal.	.30 /	.37
RR-10	lb.	.36	
S. R. O.	lb.	.015 /	.0225
X-1 Resinous Oil	lb.	.021 /	.03

Reinforcers, Other Than Carbon Black

American Resinous Chemical			
978-42B	lb.	.18 /	.19
1073-18B	lb.	.135 /	.145
1294-36B	lb.	.115 /	.125
1301-12B	lb.	.15 /	.16
Angelo Shellacs	lb.	.485 /	.7325
BRC 20	lb.	.15 /	.175
22	lb.	.025 /	.0275
30	lb.	.0125 /	.021
521	lb.	.019 /	.02
Bunarex Resins	lb.	.065 /	.1225
Cab-o-sil (compressed)	lb.	.77 /	.81
Calcene NC	ton	72.50 /	92.50
TM	ton	75.00 /	95.00
Calco S. A.	lb.	.85 /	.88
Clays			
Aiken	ton	14.00	
Buca	ton	45.00	
Burgess HC-75	ton	12.00 /	30.00
HC-80	ton	14.00 /	32.00
Iceberg	ton	50.00 /	60.00
Pigment No. 20	ton	35.00 /	60.00
30	ton	37.00 /	60.00
Catalpo	ton	35.00	
Crown	ton	14.00 /	33.00
Dixie	ton	14.00	
Franklin	ton	13.50 /	35.25
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50 /	33.00
Pigment No. 33	ton	37.00	
Recco	ton	14.00	
Suprex	ton	14.00 /	33.50
Swanee	ton	12.50	
Whitetex	ton	50.00	
Windsor	ton	14.00 /	30.00
Witco No. 1	ton	14.00 /	30.00
No. 2	ton	13.50 /	30.00
Clearcarb	lb.	.1175 /	.1225
Cumar Resins	lb.	.065 /	.17
Darex Resins	lb.	.42 /	.49
Diatomaceous silica	ton	32.00 /	48.00
Good-rite Resin 50	lb.	.42 /	.45
K Series Polymers	lb.	.15 /	.37
Hi-Sil 101	lb.	.10 /	.115
202	lb.	.11 /	.125
Indulins	lb.	.06 /	.08
Kralac A-EP	lb.	.43 /	.54
Laminar	ton	30.00	
Marbon Resins	lb.	.42 /	.49
Multifex	ton	140.00 /	155.00
MM	ton	110.00 /	125.00
Super	ton	160.00 /	175.00
Neville Resins			
465	lb.	.07 /	.0825
G	lb.	.13	
LX-509	lb.	.35	
Nebony	lb.	.04 /	.0575
Paradene	lb.	.065 /	.075
R	lb.	.13 /	.18
Para Resins 2457, 2718	lb.	.04 /	.45
Picco Resins	lb.	.13 /	.185
Piccolyte Resins	lb.	.185 /	.25
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Pliolite NR types	lb.	.98 /	1.33
S-3, -6, -6B	lb.	.42 /	.49
Purecal M	ton	56.75 /	71.75
SC, T	ton	110.00 /	125.00
U	ton	120.00 /	135.00
R-B-H 510	lb.	.15 /	.22
Resinex	lb.	.0325 /	.0375
Rubber Resin LM-4	lb.	.28 /	.35
S-Polymers	lb.	.44	
Silene EF	ton	120.00 /	140.00
Silvacons	ton	55.00 /	85.00
Witcarb R	ton	105.00 /	120.00
-12	ton	45.00 /	66.00
Zeolex 20	ton	120.00 /	140.00
Zinc oxide, commercial†	lb.	.135 /	.1675

Retarders

Delac J	lb.	.55 /	.60
E-S-E-N	lb.	.35 /	.37
Good-rite Vultrol	lb.	.62 /	.66
R-17 Resin	lb.	.1075 /	.36
Retarder ASA	lb.	.57	
PD	lb.	.35 /	.37
TCM	lb.	.65	
W	lb.	.45	
Retardex	lb.	.47 /	.50
RM	lb.	1.25	
Thionex	lb.	1.25	

Solvents

3-BX Naphtha	gal.	.37	
Bondogen	lb.	.55 /	.60
Butyrolactone	lb.	.60 /	.65
Consol #1	gal.	.37 /	.43
#2	gal.	.42 /	.48
Dichloro Pentanes	lb.	.04 /	.07
Dipentene DD	gal.	.445 /	.68
Ethylene dichloride, comml.	lb.	.09 /	.1225
GVL	lb.	1.00	
Hi-Flash 2-50-W	gal.	.41	
Pale yellow	gal.	.39	
LX-572	gal.	.27 /	.32
-748	gal.	.16 /	.23
n-Methyl-2-pyrrolidone	lb.	$0.75 /	$0.80
Neville Nos. 100, 104	gal.	.52 /	.60
106	gal.	.38 /	.46
Nevsol B	gal.	.20 /	.30
H, 200	gal.	.19 /	.29
HF, T, 30	gal.	.24 /	.34
Penetrell	gal.	.445 /	.68
Picco Hi-Solv Solvents	gal.	.19 /	.45
Pine Oil DD	gal.	.755 /	.955
PT 150 Pine Solvent	gal.	.44	
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	

Synthetic Resins

Geon Latices (dry wt.)	lb.	.38 /	.52
Paste Resins	lb.	.38 /	.59
Plastics	lb.	.35 /	.80
Polyblend	lb.	.475 /	.575
Polyvinyl Resins	lb.	.38 /	.64
Kenflex A, L	lb.	.26 /	.27
B	lb.	.23 /	.24
N	lb.	.18 /	.19
Kralastic	lb.	.65 /	1.25
Marvinol MX-300	lb.	.41 /	.57
Rigid Vinyls	lb.	.69 /	1.38
VR-10, -20, -21	lb.	.38 /	.54
Plio-Tuf G75C, G85C	lb.	.52 /	.55
Vibrin 115A	lb.	37 /	.485
117, 151	lb.	.34 /	.455
1191-S, 152LS	lb.	.38 /	.495
121	lb.	.46 /	.575
142	lb.	.55 /	.665

Synthetic Rubbers and Latices

PRIVATELY PRODUCED

Butaprene Latex (dry wt.)			
NL types	lb.	.47 /	.52
NXM types	lb.	.55 /	.60
Butaprene NAA	lb.	.54 /	.55
NF	lb.	.49 /	.50
NL	lb.	.50 /	.51
NXM	lb.	.58 /	.59
Chemigum 30N4NS, 50N4NS	lb.	.50 /	.52
N1NS	lb.	.64 /	.66
N3NS	lb.	.58 /	.60
N6, N7	lb.	.50 /	.52
Chemigum Latex (dry wt.)			
101 types	lb.	.35 /	.42
200, 245 types	lb.	.47 /	.55
235 types	lb.	.55 /	.63
Hycar 1001, 1041	lb.	.53 /	.59
1002, 1042, 1043	lb.	.50 /	.51
1014, 1312	lb.	.60 /	.61
1411	lb.	.62 /	.63
1432	lb.	.59 /	.60
1441	lb.	.64 /	.65
Hycar Latex (dry wt.)			
1512, 1552, 1562, 1577	lb.	.46 /	.52
1551, 1561	lb.	.54 /	.60
1571	lb.	.59 /	.65
1572	lb.	.51 /	.57
Ladulin-70-GR-S	lb.	.22 /	.23
Neoprene Latex (dry wt.)			
Type 571, 842-A	lb.	.37	.48
572	lb.	.39 /	.50
601-A, 735	lb.	.40 /	.51
735	lb.	.38 /	.49
Neoprene Type AC, CG	lb.	.55 /	.80
GN, GN-A, W, WHV	lb.	.41 /	.44
GRT, S	lb.	.42 /	.45
KNR	lb.	.75 /	.78
Q	lb.	1.00 /	1.03
WRT	lb.	.45 /	.48
Paracril 18-80	lb.	.60 /	.61
AJ	lb.	.485 /	.495
B, BJ	lb.	.50 /	.51
BV	lb.	.51 /	.52
C	lb.	.58 /	.59
CS, CV	lb.	.59 /	.60
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.30	4.05
Thiokol LP-2, -3, -32, -33	lb.	.96	
-8, -38	lb.	1.25	
PR-1	lb.	.95	
Type A	lb.	.47	
FA	lb.	.69	
ST	lb.	1.00	
Thiokol Latex (dry wt.)			
Type MF	lb.	.85	
MX	lb.	.70	
WD-2	lb.	.92	
-5	lb.	.95	
-6, -7	lb.	.70	
Vistanex types	lb.	.45	

GOVERNMENT

Hot GR-S Non-Pigmented

Staining		
1000, 1004, 1007, X-759	lb.	.23
1002, 1005, 1015, 1016, 1023	lb.	.2325
1021	lb.	.24
Slightly Staining		
1001	lb.	.23
1014	lb.	.235
Non-Staining		
1006, 1010, 1012, 1013	lb.	.23
1009, 1019	lb.	.2325
1018, 1022	lb.	.235

Hot GR-S Black Masterbatches

Staining		
1100	lb.	.185
Slightly Staining		
1104	lb.	$0.18

Cold GR-S Non-Pigmented

Staining		
1500, 1505, X-762	lb.	.23
Slightly Staining		
1501	lb.	.23
Non-Staining		
1502	lb.	.23
1503, 1504	lb.	.2325

Cold GR-S Black Masterbatches

Staining		
1600, 1601, 1602	lb.	.185

Cold GR-S Oil Masterbatches

100 parts GR-S, 25 parts oil		
1703	lb.	.195
1705, 1706	lb.	.1925
100 parts GR-S, 37.5 parts oil		
1707, 1708	lb.	.18
1709, 1710, 1711, 1712	lb.	.1775

Cold GR-S Oil Black Masterbatches

Staining		
1801	lb.	.17
X-763	lb.	.1575

GR-I Polymers

GR-I, 15,* 17,* 18,* 25, 35, 50*	lb.	.23

Latices†

Hot latices			
2006	lb.	.215	
2000, 2001	lb.	.2275	
2004	lb.	.26	
2003	lb.	.265	
2002	lb.	.275	
2005	lb.	.28	
Cold latices			
X-617, -734	lb.	.225	
X-765	lb.	.235	
2100, X-760	lb.	.255	
X-667, -711, -758	lb.	.26	
X-684, -710	lb.	.2675	
X-633	lb.	.275	

Tackifiers

American Resinous Chemical			
A25, A26, 716-30	lb.	.18 /	.19
555-40R	lb.	.185 /	.205
620-32B	lb.	.20 /	.21
716-35	lb.	.17 /	.18
1041-21	lb.	.165 /	.175
Acintol R	lb.	.065 /	.07
Burdol, 639	lb.	.0275 /	.0375
BRH 2	lb.	.0213 /	.0351
Bunarex Resins	lb.	.065 /	.1225
Chlorowax 70	lb.	.18 /	.24
Contogums	lb.	.0875 /	.11
Cumar Resins	lb.	.065 /	.17
Galex W-100	lb.	.155 /	.17
W-100D	lb.	.1525 /	.1675
Indopol H-35	gal.	.65 /	.81
H-50	gal.	.70 /	.86
H-100	gal.	.85 /	1.05
H-300	gal.	1.00 /	1.21
L-10	gal.	.40 /	.56
L-50	gal.	.45 /	.61
L-100	gal.	.55 /	.71
Kenflex resins	lb.	.18 /	.27
Koresin	lb.	.90 /	1.10
Natac	lb.	.12 /	.13
Nevindene	lb.	.15 /	.18
Picco Resins	lb.	.13 /	.185
Piccolastic Resins	lb.	.1855 /	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.12 /	.135
Piccoumaron Resins	lb.	.07 /	.185
R-B-H 510	lb.	.15 /	.22
Synthetic 100	lb.	.41	
Synthol	lb.	.2475 /	.2625
United	gal.	.69 /	1.20

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.60	
G-M-F #113, #117	lb.	.90	
Ko-Blend I, S	lb.	.385	
Litharge (*See Accelerator-Activators, Inorganic*)			
Magnesium oxide	lb.	.23 /	.25
Red lead (*See Accelerator-Activators, Inorganic*)			
Sulfasan R	lb.	1.50	
Sulfur flour, comml	100 lbs.	3.60 /	4.50
Aero	100 lbs.	2.15 /	7.50
Crystex	lb.	.195	
Insoluble 60	lb.	.125 /	.13
Rubbermakers	100 lbs.	2.40 /	4.30
Stauffer	lb.	.0215 /	.0335
Telloy	lb.	2.50	
Vandex	lb.	6.00	
Vultac No. 2	lb.	.47 /	.755
3	lb.	.51 /	.795
White lead silicate (*See Accelerator-Activators, Inorganic*)			

* Also available packed in coated cartons at the same price.

† These prices are for latex in tank-car quantities (10,000 gallons).

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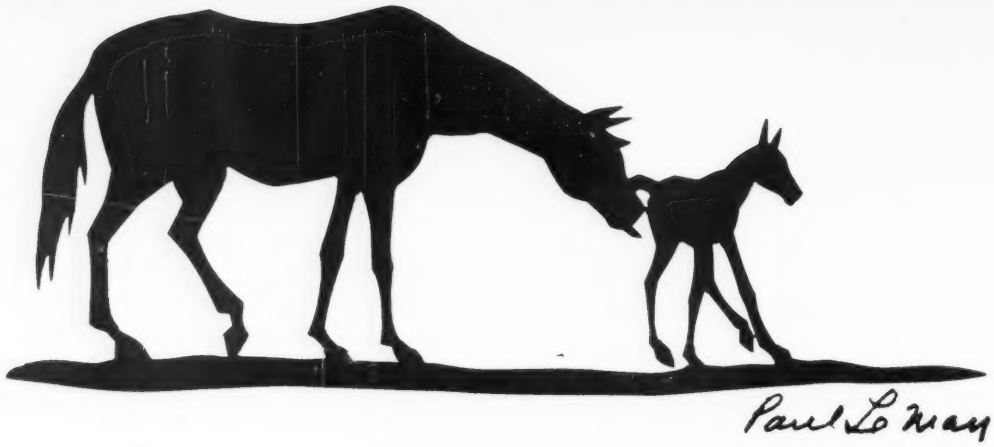
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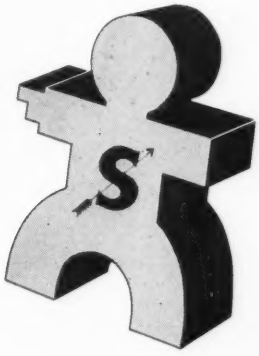
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